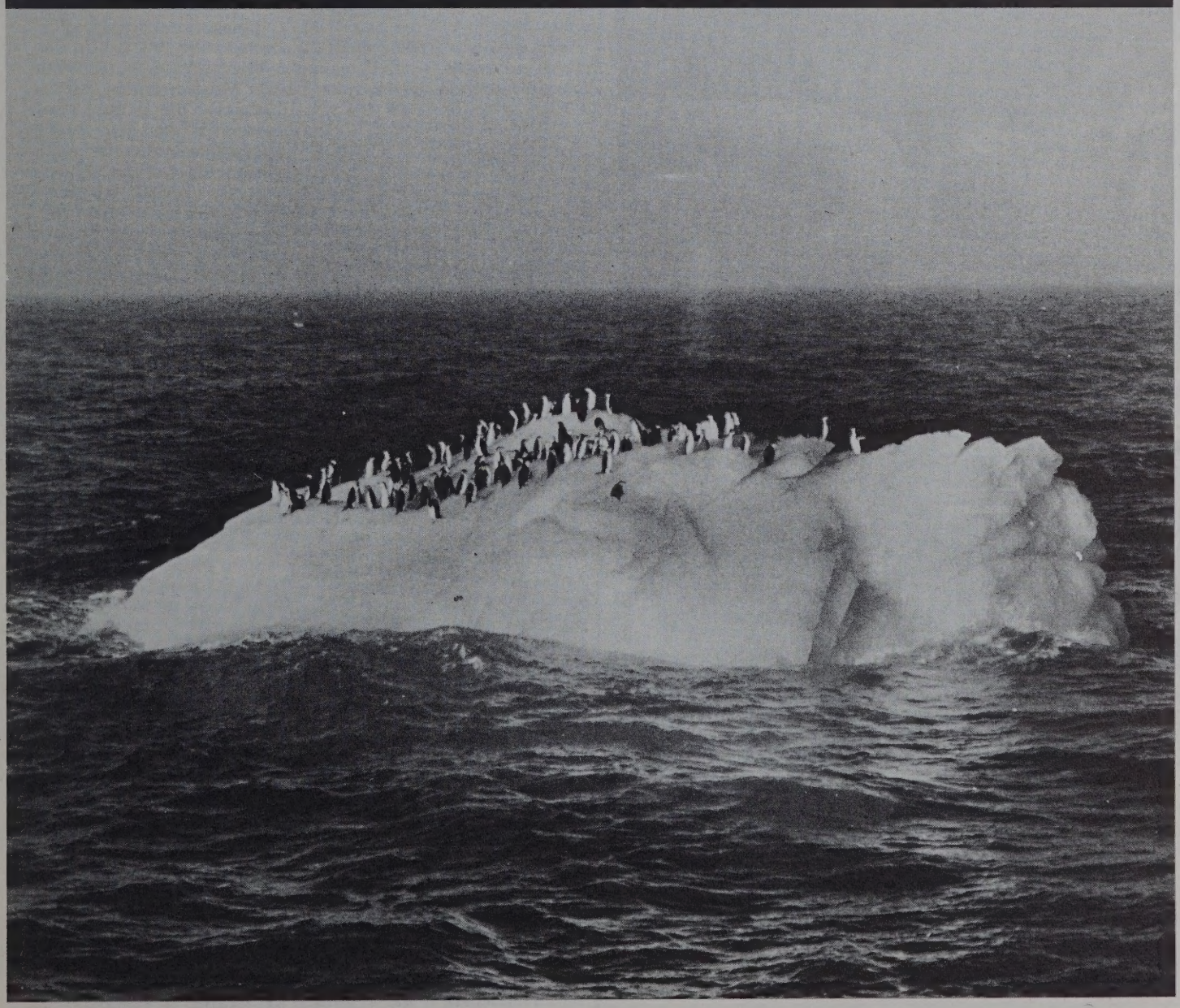
THE POLAR TIMES



STUDENTS of Western Michigan University anchor their Zodiac Mark III in Adagdak Straits.

Frontier Classroom

Student Explorers Earn College Credit for Safaris

EXPLORERS like Magellan and Columbus were born, not made, but Professor T.P. "Ted" Bank II has reversed the process. He has helped his university, Western Michigan in Kalamazoo, initiate a program of world-wide exploration carrying up to 40 hours of credit for students.

Bank, an anthropologist and author, has led more than 30 expeditions into the Aleutians and the Bering Sea. He believes that having a student learn in the field "provides for self-discovery and self-reliance."

APPLICANTS must document experience in travel, camping, boating, scuba diving, skiing, and mountain climbing. Other desirable talents are with photography, ham radio operation, cooking, carpentry, and motor maintenance.

During an Aleutian field trip in July and August, caves, graves, and abandoned villages were studied. Island hopping was by inflatable boat, a 15-foot Zodiac Mark III of a type also used by Jacques-Yves Cousteau, the oceanographer. Made of nylon, each boat can carry a crew of four and a ton of equipment. It can be packed away in a carrying case the size of a golfbag.

The expedition studied the flora and fauna on the islands, preserved specimens, studied marine biology, and even did some diving around hulks of ships that sank in Aleutian storms.

PROFESSOR BANK sets up a laboratory between tanks on Unalaska to press flower specimens.

King Features Syndicate

THIS HEAVY LOG rests more than a mile from the sea where it was deposited by Aleutian tidal wave.

The Polar Times

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No. 77 *DECEMBER 1973*

NIXON SIGNS BILL FOR OIL PIPELINE CROSSING ALASKA

Terms Measure a First Step Toward Making the Nation Self-Reliant for Energy

By EDWARD COWAN
The New York Times

WASHINGTON, Nov. 16—President Nixon signed the Alaska pipeline bill today and hailed it as a first step toward making the United States wholly self-sufficient for its energy supplies by 1980.

An official of the Department of the Interior expressed confidence that the law authorizing the 789-mile pipeline from Prudhoe Bay on Alaska's North Slope to the warm water port of Valdez would survive any challenge in court.

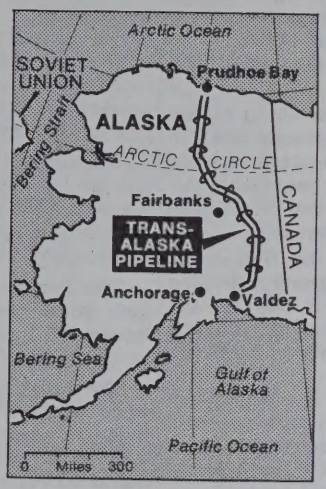
The measure also declares it to be the will of Congress that the pipeline be built "promptly without further administrative or judicial delay or impediment." Seventeen members of Congress were present for the signature ceremony in the White House.

The measure seeks to confine judicial review to the question of constitutionality, it orders that any such challenge be tried on an expedited basis with any appeal to go directly to the Supreme Court.

Jared G. Carter, a Deputy Under Secretary of Interior, said, "We rate our chances of success, if a lawsuit is brought, as excellent."

In a prepared statement that he did not read during the Oval Office ceremony, Mr. Nixon saluted the $4.5-billion venture as "the largest single endeavor ever undertaken by private enterprise."

The President said the line would be completed by 1977, but officials of the Alyeska Pipeline Service Company, the consortium of seven oil companies that will build the line, said that the 1977 date was



only a hope, not a certainty.

The company estimates that it must receive some 1,100 permits from Federal agencies in the course of construction. For example, Interior Secretary Rogers C.B. Morton said, the Environmental Protection Agency must license the emissions from the 12 pumping stations that will make the crude oil flow through the line at a rate of seven miles an hour.

Mr. Morton said at a news briefing after the White House ceremony that he would sign no permit until Alyeska came to terms about payment of $12-million that Mr. Morton said was owed to the Government for extraordinary expenses incurred in the preparation of the project's environmental impact statement. He estimated that negotiations on the payment could take as long as six weeks.

The pipe's interior diameter is 48 inches, giving it a transmission capacity of two million barrels a day. Originally, Aleyska had contemplated that such output would not be reached for years after the completion of construction, but more recently, there has been talk of compressing that schedule. However, Aleyska is not prepared to say when it will deliver two million barrels of oil a day to the tankers that will load at Valdez and unload at West Coast refineries.

The constortium's Washington ofice said that the flow might reach 1.2 million barrels a day within a year after completion of the pipeline but that "the owner companies have not made a decision to do anything other than the 600,000-barrel initial rate."

As it is now developed, the Prudhoe Bay oilfield can produce only 1.6 million barrels a day. However, with the bill signed, additional development and exploratory drilling are expected.

The Prudhoe Bay discovery, announced in February, 1968, has been conservatively rated at 9.6 billion barrels. A White House "fact sheet" said: "Additional development is expected to increase this figure to 15 billion." If pumped out at the rate of two million barrels a ady, 15 billion barrels would last about 20 years.

To the west of Prudhoe Bay lies the Naval Petroleum Reserve No. 4, largely unexplored but believed to hold tens of billions of barrels of oil. Mr. Morton, when asked, said extensive exploration of the reserve would be "in the national interest."

Mr. Nixon offered to Senator Henry M. Jackson, Democrat of Washington, the first of the four pens he used to sign the bill. Mr. Jackson, who had sponsored the legislation and worked hard for its passage, demurred, saying the pen should go to Mrs. William Pecora, who was present, the widow of an Under Secretary of the Interior

Alaskan Pipeline Jobs Scarce, Brennan Warns

WASHINGTON, Dec. 8 (UPI)—Labor Secretary Peter J. Brennan has warned job seekers not to go to Alaska looking for work on the new oil pipeline construction project unless they have already been promised employment.

"There are virtually no jobs available, the unemployment rate there is double the national figure, and it is already 30 degrees below zero at some points along the pipeline route," Mr. Brennan said this week.

The Labor Secretary said workers looking for jobs on the pipeline had been going to Alaska in growing numbers over the last few months, since it became apparent that a pipeline would be built. President Nixon two weeks ago signed legislation clearing the way for the project, but construction is not expected to begin until the middle of next year at the earliest.

BILL ON PIPELINE HAILED IN ALASKA

Governor Says the Signing Ends a Long Struggle

The New York Times

JUNEAU, Alaska, Nov. 17.—Alaskans are ready and eager to build the 789-mile oil pipeline from Prudhoe Bay to Valdez planned by the Alyeska Pipeline Service Company.

When President Nixon signed the trans-Alaska pipeline authorization bill yesterday, Alaskans were happy but restrained. The people of the 49th state have been anticipating fortunes from the pipeline and the 9.6-billion-barrel North Slope oil field for so long that the formal signing was almost anti-climactic.

Gov. William A. Egan, summarizing the reaction of Alaskans, said the signing of the bill "marks the end of a long and vigorous struggle by Alaskans for development of the facilities necessary to begin moving our vast crude oil resources to market to help meet our nation's critical energy needs."

Laborers, shop owners, innkeepers and bankers here expect to prosper while 10,000 to 18,000 men take three or four years to build the 48-inch-diameter pipeline carrying hot oil across the tundra and around the frozen mountains of Alaska.

Government officials also expect to hire thousands of employes to provide increased services such as police and fire protection and for the new schools needed for the influx of pipeline workers and their families.

Governor Egan already is calling for a "hard line" hiring policy that will give at least 3,000 pipeline jobs to native Alaskans, but many pipeline welders are expected to come from a union hiring hall in Tulsa, Okla.

Alyeska, a consortium of seven companies that will own the line, will increase its office staff in Anchorage from 50 to about 350 while hiring about 6,000 workers to start construction next year. Pipe has been coated and stored at Prudhoe Bay, Fairbanks and Valdez for more than three years.

A special 27-day session of

the Alaska Legislature, which ended late Monday, removed oil company objections to controversial laws the companies contended would have prompted a possible delay in pipeline construction.

After the 1972 Legislature passed several bills such as a right-of-way leasing act that included an option for the state to purchase 20 per cent ownership of the $4- to $5-billion pipeline, the companies filed suit in State Superior Court saying that the legislation should be declared an unconstitutional intrusion on interstate commerce.

In the spring of 1973, Governor Egan began negotiations with the companies to rewrite the legislation and remove a possible threat of a delay in pipeline construction. After four meetings with the oil company representatives, led by Charles E. Spahr, chairman of The Standard Oil Company of Ohio, Governor Egan called a special session of the Legislature to act on eight bills drafted in concert with the oil company attorneys.

The Republican-dominated Legislature essentially agreed with the Governor and acted to remove what pipeline proponents called "front-end litigation."

The legislators dropped the state option to purchase a share of the pipeline, removed a right-of-way rental formula that would have cost the oil companies about $42-million annually and eliminated a provision known as a royalty credit, which would have eroded the industry's traditional calculations of oil royalties by a standard known as "wellhead value."

The Alyeska pipeline was also exempted from being required to obtain a certificate of convenience and necessity from the Alaska Pipeline Commission.

In return, the companies accepted a nine-cent increase in the cents-per-barrel severance tax to about 27 cents a barrel and a sliding tax scale pegged to the Department of Labor's wholesale price index for crude oil.

The Legislature also passed a 20-mill state property tax, the first in Alaskan history, that was expected to raise about $14-million next year and about $100-million annually after the pipeline is built.

The pipeline and its support facilities will double the existing tax base of this state of 302,000 people.

The combination of royalities, severance taxes and ad valorem assessments is projected as a $500-million annual income for the state once the Alyeska line is pumping its capacity of two million barrels daily.

Alyeska also obtained a special state deed, without public auction, to about 900 acres in Valdez, the ice-free port on Prince William Sound that will be the oil storage area and southern terminus of the pipeline. Under the legislation, Alyeska is expected to pay about $10-million for the land and begin construction within months.

The highway system here will probably double, with the first 360 miles of new road being a pipeline haul road built of gravel from the Yukon River north to Prudhoe Bay.

The Polar Times

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AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends "The Polar Record," published by the Scott Polar Research Institute, Cambridge, England.

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are one dollar a year, which entitles members to receive THE POLAR TIMES twice a year.

Back issues are 50 cents each.

COVER PHOTO

The photograph was taken by Arnold Whitehouse, a crewman on the research vessel Knorr in Antarctic waters this year.

Defense Unit Proposes Military Oil Pipeline Across Alaska to Provide Self-Sufficiency

WASHINGTON (UPI)—A Pentagon energy panel has proposed full development of the U.S.' vast and largely untapped Naval petroleum reserves, including construction of a military oil pipeline across Alaska.

The task group indicated this would render the Defense Department self-sufficient in meeting military petroleum requirements for either peace or war within 10 years and—depending on how it was carried out—might also help relieve U.S. civilian fuel shortages.

Cost of the program would be between $4 billion and $5 billion, the task group estimated in a report. It said about half this amount would be spent to build the pipeline, with the rest paying for oil-field exploration and development.

An unclassified version of the report obtained by UPI said the proposed pipeline would run from Naval petroleum reserve No. 4, a 23.7-million-acre field on Alaska's North Slope, to an unspecified ocean terminal probably on the southwest Alaskan coast.

This recommendation appeared unrelated to a proposal by William Simon, the new U.S. energy policy chief, that the trans-Alaska pipeline, approved by Congress last month, be matched by a second pipeline. A spokesman for Mr. Simon said the energy chief was simply "recognizing the eventual need for an additional pipeline."

Conservationists strongly opposed authorization of the trans-Alaskan pipeline last month and proposals to build a second one—and particularly a third one—would surely face even more opposition by organizations dedicated to preserving Alaskan ecology and northeastern Pacific fish from oil spills.

Neither the Detense task group's proposal nor the one by Mr. Simon has been formally presented to Congress, which would make the final determination about constructing any new government-financed pipeline.

The Pentagon said the report of its energy task group was being studied by the armed forces and that a decision hasn't been reached on the report's recommendations.

The report urged the Secretary of the Navy, who oversees the Naval petroleum reserve fields, to prepare immediately to ask Congress to provide accelerated programs of tapping Naval oil reserves.

If Congress refused to approve the full costs of this program, the report said, the Navy secretary should pursue an alternate strategy "that will permit industry participation in the exploration, development and production of the reserves." If this happened, it said, Congress should also be asked to pass legislation letting private industry take any oil in excess of military needs from the reserves.

Alaska fishery may close

By Reuter

Anchorage, Alaska

The once-mighty Bristol Bay red salmon fishery, which used to produce more salmon than any other in the world, had the worst year of its history this year, and prospects for next year include closing the facility.

Of a forecast of 6.2 million fish, scarcely 2.3 million returned to Bristol Bay waters this year, and of that, fishermen harvested only 700,00.

Such a minuscule catch from a fishery that harvested up to 20 million fish in years in the past spelled economic hardship for the 600 fishermen who sought their living there and for year-round residents meant virtual disaster.

The short July season is the only source of income in the residents' otherwise subsistence hunting-and-fishing economy. A complete closure next year — for the first time in the fishery's 80-year history — will force virtually the entire population of Bristol Bay onto welfare.

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Hopes of Alaskan Village Hinge on Pipeline

By WALLACE TURNER
The New York Times

BARROW, Alaska, July 7—The rusty, errant pipe that travels from house to house here, teetering on old oil barrels, or tunneling beneath the streets, is a symbol of the break with the harsh, cruel life of centuries past as well as a talisman of hope for the future.

Even in summer it is hard to live here. There was rain on Independence Day, and the Eskimo children's dances were rescheduled. The next day there was snow. They say the sun has not set since one night in May, but to believe that a sun exists behind the fog and mist requires faith.

Ten feet of open water lies darkly sullen between the dirty white of the pack ice, stretching north to the horizon, and the pea gravel of the beach. Walkers in parkas lean into a cold wind that comes off the ice.

For a mile along the beach and a half mile inland there is a scattering of small, low, square houses that make up Barrow. The pipes that link the houses carry natural gas from wells drilled on a Navy petroleum reserve that begins just outside the village.

The gas line replaces the whale oil fires used in the past or the 55-gallon fuel drums used by Eskimos who live on the Bering Sea. The gas itself comes from the huge reserves of gas and oil being located in the Arctic.

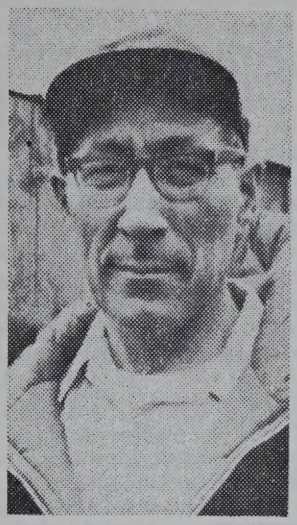
This place, with perhaps 2,000 residents, calls itself the biggest Eskimo village in Alaska. Also, it has become the seat of government for a sprawling new political entity that will affect the development of one of the major oilfields in North America, that at Prudhoe Bay, 175 miles east of here on the Arctic Sea.

The future here is entwined with the future of the oil development, and that rests with the pipeline that will probably cross Alaska from Prudhoe Bay to Valdez, when the Government decides at it should be built.

The new political entity is the North Slope Borough, which includes only 4,000 people living in 88,000 square miles.

For the most part they live here or at dots on the map called Anaktuvuk Pass or Point Hope or Barter Island, all between the Chukchi Sea, the Canadian border, the Arctic Ocean and the Brooks Range.

Some still live the wild, free life of the migrant Eskimo hunter, fisherman and trapper The Eskimos grow up speaking the tongue of their ancestors



The New York Times
Mayor Eben Hopson of the North Slope Borough.

English is a language that some have acquired well, and some have not.

Joe Kaleak, a driver for the Top of the World Company, speaks English to his customers from "outside" and Eskimo to his radio dispatcher.

"I was outside to California," he said, swerving his cab through a mudhole. It was for six months in basic training at Fort Ord when he was in the Eskimo National Guard battalion 15 years ago.

Eben Hopson has been "outside" many times, although he ended his formal education at the Bureau of Indian Affairs grammar school here.

Mr. Hopson was an adviser to Gov. William A. Egan of Alaska but left that job about 18 months ago to come back here and campaign for acceptance of the North Slope Borough. He also campaigned for election as the first mayor of the borough and won on both matters.

The oil companies have hired many Eskimos as laborers. The Atlantic Richfield Company, for example, has 40 employes working at Prudhoe Bay, and 24 of these are Alaska natives. They spend a week of seven shifts of 12 hours each, and then go home to Barrow for a week. The laborers earn about $15,000 a year.

When the pipeline is built, there will be 300 to 500 wells in the field. There now are about 65 wells, all capped. Employment will grow to 400 or 500 by Atlantic Richfield and British Petroleum, which will operate the field. Many workers will be Eskimos.

Eskimo leaders see these job opportunities as beneficial but they think the oil discoveries should bring more to the Eskimos. The oil lies below their lands, they say, and the Eskimos should benefit from its sale.

Meanwhile, the oil companies have tried and failed in a court suit to prevent creation of the borough.

The companies then asked that the borough be prevented from levying and collecting taxes until their appeal was decided. After the borough budget had been made up such a court order was issued. This left Mr. Hopson and his five assemblymen with a budget but with their property tax rolls decimated. They had assessed property of $765-million on the rolls and the court order removed $565-million of it.

The borough then quadrupled the millage rate and levied the entire $4.2-million in taxes against what property was left on the rolls. This has been shattering to holders of some undeveloped oil leases in the North Slope region. They find their lease-holds valued as if they were on proved oil land, which they are not, and then taxed at high rates.

In years to come, if it survives legal tests, the borough tax load will climb spectacularly as it assumes costs of schools, road systems and other services now paid for by Federal and state governments.

The dispute has emphasized the fact that many of the companies that bought leases in the frenzy of the state oil-lease auction in 1969 will never recoup their investments.

Those leases did not cover land within the Prudhoe Bay field, which is the only one proved so far. That field is 95 per cent controlled by Atlantic Richfield and British Petroleum, who are developing it. Between them, they paid just under $12-million for leases that have at least $30-billion worth of oil under them. There is a possibility that the really big lease money was paid for land with little or no oil under it.

When the pipeline is in operation and the wells are producing, the state's income from its one-eighth royalty and severance taxes will be from $400-million to $500-million a year from known reserves.

Estimates are of a minimum reserve of 10 billion barrels, which would last for 15 to 20 years at the projected delivery rate now discussed. Gas reserves are estimated at 21 trillion cubic feet.

Meantime, Alaska's Legislature is steadily using up the $900-million realized from the 1969 lease sale, cutting it down to $640-million at present. The first tax-royalty income from Prudhoe Bay is not expected until 1977-78.

Delay in pipeline construction could be catastrophic to the state, because it has been spending on a bigger scale.

The Alyeska Pipeline Service Company is ready to begin construction if its design is approved, and some way is found to circumvent the problems in its way. These now are chiefly that its pipeline right-of-way requirement is greater than the law will allow it to have in some areas of the route.

The 789 miles of pipe for the line is stacked at Prudhoe Bay, at Fairbanks, and at Valdez, the southern terminal on Prince William Sound, an all-weather port. The announced plan is to haul petroleum by tanker to refineries on the West Coast.

Meanwhile, life changes gradually in Barrow.

Where Eben Hopson, 51 years old, the mayor of the new borough, spent his first nine years living with his itinerant family along the Arctic seashore and was not able to go to high school. And the 26-year-old Jacob Adams, Mayor of Barrow and an Assemblyman for the new borough, grew up in Barrow and went to a high school operated by the Bureau of Indian Affairs at Sitka, 1,500 miles south of Barrow.

While Mr. Hopson discussed his views about oil and the borough government, his wife prepared food for a four-day family fishing trip to a lake 15 miles away. They will live in a tent, and will go there in a snow vehicle that can slide over the low vegetation of the tundra.

While Mr. Adams talked, his 2-year-old daughter, Maggie, crawled up his knees, across his lap, and nestled her head on his shoulders.

Both men hope to see a better life here. They hope for a better road system (the roads now end at the edge of the village), for better health care, and a better airport. They want a high school in Barrow so children no longer will leave their families for nine months at a time.

The Mail Gets Through

Little Diomede Island, Alaska, Dec. 25 (AP)—Residents of this tiny outpost of America in the Bering Sea got their first mail since September on Christmas Eve. The mail was delivered by a plane that landed on the frozen sea. Little Diomede is near the International Dateline, which comes between Alaska and Siberia. The rocky island about 125 miles west of Nome does not have a landing strip.

Hiatt assumes duties as UA's new president

Aug. 22

The University of Alaska's new president, Dr. Robt. W. Hiatt, settled into his office here Monday, met with top administrators, and made preliminary plans for a tour of the various campuses of the university in the fall.

Hiatt assumed his new duties on July 2 but left the state shortly thereafter for Washington, D.C. for a debriefing session regarding his former duties as United States consular officer and counselor for scientific affairs in Tokyo. Then he returned to his home in Hawaii to prepare for the move to Alaska.

Hiatt was a teacher and administrator for 26 years at the University of Hawaii before retiring from that institution in 1969. He holds a A.B. degree from San Jose State College and a Ph. D. in marine zoology from the University of California at Berkeley.

Dr. Robert W. Hiatt

Sept. 5

The W.K. Kellogg Foundation has approved a $681,461 grant to the University of Alaska for the development of a major, long-range educational program designed primarily to help Alaska natives acquire the skills needed to manage their own increasingly complex affairs in a time of rapid social and economic change.

Announcement of the grant approval was made today by Dr. Robert W. Hiatt, president of the university, at a meeting of the Alaska Rural Development on the Fairbanks campus.

The Kellogg Foundation grant is to be allocated to the new native leadership development program over a five-year period. Program philosophy and general direction will be determined by a policy council comprised of three members from the university and three selected by the Alaska Native Foundation and Alaska Federation of Natives. The six members together will choose a seventh council member.

"We at the (Kellogg) Foundation are pleased to be in a position to assist the University of Alaska in this significant project," Gary W. King, program director, wrote the university. "The organization you have developed to provide for the interaction and cooperation of the university and the major native groups promises to utilize the constructive inputs from the concerned parties for the benefit of the total program."

UNIVERSITY of ALASKA

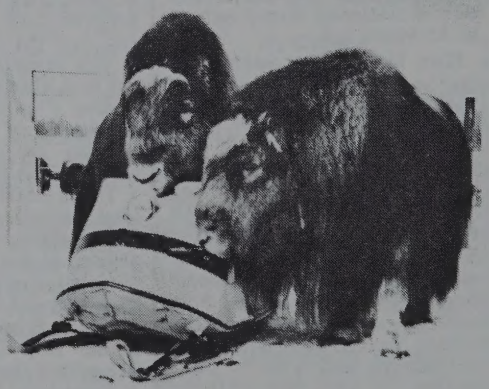
ONE OF THE nation's 71 land-grant universities, the publicly supported, coeducational University of Alaska opened in 1922 as the Alaska Agricultural College and School of Mines. It assumed its present name in 1935. From six students in 1922, Fairbanks Campus enrollment grew to more than 3,100 in 1972-73.

In addition to the Fairbanks Campus, the University operates four-year colleges at Anchorage and Juneau, and eight community colleges located throughout the state.

Undergraduate offerings of the University include programs leading to Associate degrees in the arts, business administration, and science, and to Bachelor's degrees in the arts and letters, business administration, education, engineering, and the sciences. Advanced degrees—Master's and Doctorates—may be earned in a number of disciplines.

The University operates several research institutes, devoted largely to the study of the arctic and subarctic environment and its peoples and wildlife.

Public-service activities of the University include off-campus "short courses" in many subjects; a Cooperative Extension Service; extension programs in mining and fisheries; and numerous special educational programs. At Fairbanks, the University operates the state's only educational radio and television stations.



Two curious members of the University of Alaska musk ox herd investigate a snow machine.

The Musk Ox Project

Established in 1964, the University of Alaska's Musk Ox Project seeks to develop a new economic resource for Native Alaskans through domestication of the musk ox to permit commercial production of its valuable underwool, qiviut, a fiber softer, lighter, and stronger than cashmere.

At the University's Musk Ox Farm, selective breeding is practiced in efforts to increase the quality and quantity of qiviut yield, promote docility, and produce a hornless breed. In the summer of 1973, the herd numbered about 150 animals.

Labor-Saving Aids Viewed as Threat To Eskimos' Health

CHICAGO, Dec. 15 (AP)—Eskimos are enjoying the easy life and may be paying for it with their health, two Medical researchers say.

The researchers, reporting in the Dec. 10 issue of the Journal of the American Medical Association, said that labor-saving devices used by adult Eskimos in western Alaska were apparently affecting their health. Among the devices are snowmobiles in place of dog sleds and chain saws instead of hand saws.

Drs. George J. Mouratoff and Edward M. Scott said that studies they made a decade apart showed "more Eskimos were intolerant of glucose in 1972 than was true 10 years earlier."

They tested the Eskimos to determine the incidence of diabetes, or conditions that might lead to diabetes. Glucose, or sugar, intolerance is considered to be a condition that may lead to diabetes mellitus, the most common form of the disorder.

After their first study, the doctors suggested that the active life led by Eskimos "might be an important factor" in the rarity of diabetes and prediabetic conditions. Both in 1962, when 187 Eskimos were tested, and in 1972, when 320 were tested, only one case of diabetes was found.

However, while 0.7 per cent of the men studied in 1962 showed glucose intolerance, 5 per cent were found to have glucose intolerant in 1972. Among women, the figure rose from 7.2 per cent in 1962 to 9.4 per cent in 1972. Intolerance was measured by the ability of the body to metabolize glucose, as determined by blood tests.

Alaskan Sled-Dog Race Slated for Next March

The second running of America's leading sled-dog race—a 1,100-mile trek from Anchorage to Nome, Alaska—is scheduled for next March 2.

Officially named the Iditarod Trail international championship sled dog race, the event is run over the historic Iditarod trail, a winter sled-dog trail into the Alaska interior that linked south-central Alaska to Nome and the Bering Sea.

A $50,000 purse will be split among the top 20 finishers. Last year 34 entries began the race, with 22 finishing.

A.E.C. Is Abandoning Amchitka to Wind and Fog

By ANTHONY RIPLEY
The New York Times

AMCHITKA, Alaska — The horizontal rain, riding the cold, rough wind, whips across the airstrip this time of year, cutting through a visitor's clothes.

The sky is ashen, the tundra of the treeless island bright green, while the old scattered Quonset huts of World War II seem to sink deeper into the green turf.

And when the rain stops, fog arrives in soggy patches in this remote corner of the United States.

It is an island few Americans have seen. The military men stationed here in World War II remember it but few tourists make it out this far, 1,375 miles west south west of Anchorage, half way to the Japanese home island of Hokkaido.

The soldiers went home many years ago.

Now the Atomic Energy Commission is going home, too. It has used the island as a site for three underground nuclear explosions, the first, called Longshot, in October, 1965, in cooperation with the Defense Department's advanced research project Agency.

But after that, beginning in 1965 and 1966, the Atomic Energy Commission spent $200-million for two more tests—Milrow, fired on Oct. 10, 1969, and Cannikin, on Nov. 6, 1971.

The mark they have left on the island is less distinct than the slowly collapsing Quonset huts, rotting docks and tumbled building of World War II.

The A.E.C., newly concerned with ecology, has spent $1-million cleaning up its leftovers and trying to restore the sites.

In mid-July, Dr. Dixie Lee Ray, chairman of the A.E.C., led a party of 30 to the island to inspect the cleanup and to announce officially that the commission was through there.

The helicopters offered by the Navy were useless in the alternate fog and rain and the party, wrapped in heavy clothes and yellow slickers, toured the island in a small bus.

The A.E.C. set up a temporary headquarters for its weapons tests in a vast series of interconnected mobile units, lashed down against the winds that reach to 100 miles an hour in the winter. By September, when the barges come in to clear the last cargo, the headquarters will be mostly dismantled and gone, too.

"We're leaving it as well as it can be left," Dr. Ray said.

One of the marks that will remain is a new lake formed when Cannikin, the largest underground nuclear test ever attempted, exploded 5,875 feet underground.

It was a final proof test of a Spartan antiballistics missile warhead of five megatons, equal to the power of 5 million tons of TNT.

The new lake, called Cannikin, was formed in the roughly triangular depression a mile and a half across where the ground sank from the tests. At the deepest point of the subsidence, the tundra dropped 55 feet.

Huge cracks can still be seen in the tundra from the explosion and will take many years to disappear, scientists said. Along the coast of the Bering Sea, a flat broad shelf of tidal rock was raised by four feet.

Amchitka is in the Rat Island group of the Aleutian chain and is one of the world's most seismically active areas. Geologists say that some 20 miles below the island, the northward moving Pacific Ocean floor is slowly driving back into the earth's molten core.

No Harmful Effects

A panel of scientists in 1968 recommended against firing such big weapons on Amchitka because of the earthquake problems and the uncertain effects such a huge explosion might have. But the tests were set off with no apparent major consequences.

With budget cutbacks, the commission has been carrying out fewer and fewer of the large, expensive underground tests. They averaged about 30 a year following the 1963 limited test ban treaty. But only 11 were fired in 1971, seven last year and seven so far this year, according to a commission spokesman.

The A.E.C. also conducts an unannounced number of small tests at its Nevada test site.

The small weapons program continues to be "vigorous," one official said.

On Amchitka, the wildlife is beginning to return but it is a slow process, according to Karl Kenyon of the Interior Department's Bureau of Sport Fisheries and Wildlife.

Plane Flies Home From Ice Island

Alaska International Air's four-engine Hercules number N921NA touched down at Fairbanks International Airport at 11:56 a.m. on Thanksgiving Day for the first time in more than eight months.

A cheer went up from the crowd of Alaska International Air employes and onlookers as pilot Jerry Chisum eased back on the throttles and the cargo plane completed its return from T-3, Fletcher's Ice Island, where it had broken up on a rough runway on Feb. 28, 1973.

AIA maintenance men under the leadership of Art Walker had reconstructed the airplane over the summer and performed one of the most unusual feats in the annals of aircraft repair in the process.

Operating with few tools and under difficult weather conditions, about a dozen AIA employes had removed the broken wings from the plane, replaced the wing center section and attached newly constructed wings.

AIA chief pilot Chisum had been flying the plane in February when the wings cracked after touching down hard on the undulating ice runway. The airline thought it only fair that he and the same crew that took the plane into the ice island bring it out again. Chisum and the airline have reportedly been cleared of any fault in the crash by Canadian officials who investigated the accident.

Walker, the airline's chief maintenance man, also was on board when the plane touched down in Fairbanks.

Although the plane could not be pressurized properly on the island, Chisum flew the plane to Inuvik, in Canada's Northwest Territories at 25,000 feet. As the plane climbed past the 10,000 foot level everyone on board donned oxygen masks. After the brief refueling stop in Canada, the plane continued on to Fairbanks at a lower altitude so the crew could stop breathing oxygen, a practice that tired them out on the first leg, and could move freely about the giant cargo carrier.

When the plane arrived in Fairbanks where it will undergo additional repairs, AIA president Neil Bergt greeted the crew and started the champagne flowing for all the employes who had waited anxiously for one-third of the firm's Alaska fleet to return.

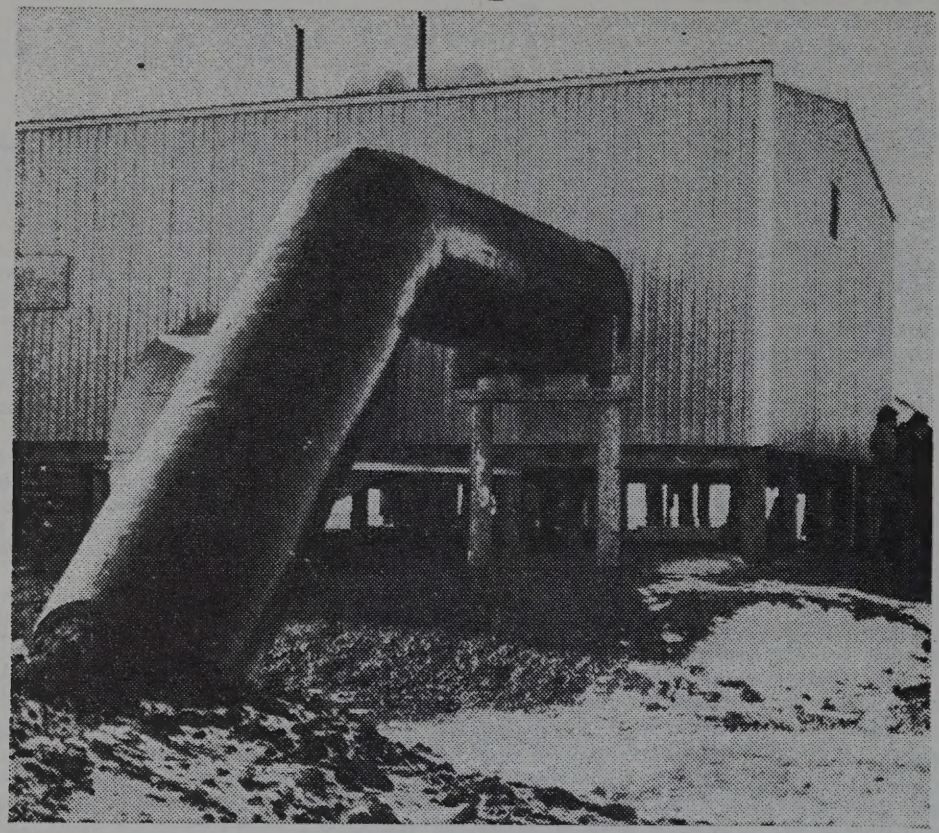
Polar bear protected in arctic region

The hunting of polar bear is to be prohibited throughout the Arctic region, following an agreement between five countries represented at an International Conference on the Polar Bear in Oslo in November. The agreement was signed by Canada, Denmark, Norway and the United States. The Soviet Union is expected to sign by March 1974.

The treaty is the first international agreement for environmental protection in the region. For the five signatories, it provides that all hunting or trapping of polar bear will be prohibited. The agreement presupposes that further steps will be taken to protect the Arctic environment in general. As for Norway, the agreement means that the hunting ban in force on Norwegian territory since this fall will in the future apply internationally.

Certain limited exceptions have been made for the Eskimo living in Greenland, Canada and Alaska who depend on hunting polar bear for their subsistence. It is, however, specified that such hunting must be done by traditional methods and not by the use of aircraft or large motorized vessels. The contracting parties are also instructed to promote compliance with the agreement by nationals of states that have not signed the agreement.

Far North Gas Pipeline Is Tested



The New York Times/Gladwin Hill

A view of part of the experiment station at Sans Sault, Canadian Northwest Territories, where the buildings had to be built on stilts so heat from them would not thaw the permafrost below. The pipe is used in an experiment in conveying natural gas.

By GLADWIN HILL
The New York Times

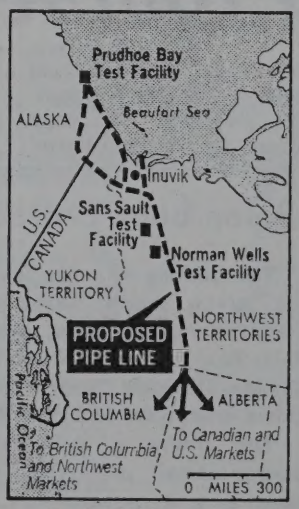
SANS SAULT, Northwest Territories—Before spending $5-billion on a technically unprecedented engineering project it is considered good form to find out if it is going to work.

That is why $4.5-million has been invested in a tiny clearing in the Canadian wilderness, only half a mile square, here in the Mackenzie River Valley 250 miles south of Arctic Ocean.

The facility, 100 miles from the nearest sizable settlement, consists principally of a small cluster of plywood and sheet metal buildings, some fuel tanks, and two 1,000-foot loops of pipe, four feet in diameter, partly above ground and partly buried.

"If any Russian satellite has snapped a picture of this," one technician remarked, "they must be still scratching their heads in Moscow."

Experiments conducted here over the last two years have no military implications Hinging on them, rather, is the question of whether millions of households in the United States, and in Canada, can be supplied with natural gas in the years ahead or whether, conceivably, currently growing gas shortages might force a shift to some other fuel.



The New York Times/Oct. 19, 1973

Six hundred miles northwest of here, in the newly discovered oil fields at Prudhoe Bay, Alaska, are upward of 26,000 billion cubic feet of gas—about 8 per cent of North America's proved reserves.

A consortium of 26 United States and Canadian companies has a plan to pipe this gas some 1,500 miles down the Mackenzie River Valley to southern Canada, to link up with distribution systems in the western parts of the two countries.

It is possibly the biggest engineering project in history, far exceeding in length and cost the planned 789-mile pipeline to move Prudhoe Bay oil westward to an ice-free Alaska port.

The earth along both pipeline routes is perpetually frozen and is commonly called "permafrost."

The oil pipeline has to run largely above ground with the oil heated so it will not freeze. The gas pipeline presents just the opposite problem. For a combination of environmental and maintenance reasons, an aboveground gas line was rejected in favor of the idea of burying the pipe in a trench several feet deep.

Gas will not freeze at natural temperatures. But if fed through the pipeline above freezing, it would thaw the permafrost and leave the pipeline "floating" precariously in a slough of mud.

A solution seemed to be to keep the gas chilled to freezing. Two years of research and experimentation have been devoted to proving out the feasibility of this type of transmission.

Doing anything here, with Arctic temperatures the year around, was not easy. The complex of interlocked plywood boxes providing living quarters for a force of up to 40 men had to be built on stilts so its heat would not melt the permafrost. Sewage has to be refined to drinking-water quality before discharge because normal drainage and filtration does not exist.

The twin test loops of pipe that are the most conspicuous features of the facility run through several types of soil at different levels.

From hundreds of electric sensors and visual gauges attached to the pipe millions of temperature and stress readings have been compiled.

Partial thawing has to be provided for along the southern reach of the pipeline. Laborious engineering experiments established that pipe "floating" could be averted by pinning the pipe down with giant "staples"—inverted U-shaped steel straps anchored in concrete piles.

The Sans Sault facility is one of three field research stations established for the project. About $7-million has been spent on them to date. One at Prudhoe Bay has also experimented with various pipe depths, trench construction and revegetation. At Norman Wells, 100 miles south of here, transmission temperatures ranging from 60 degrees Fahrenheit down to 15 degrees were tested.

Along with the engineering work there has been an elaborate program of environmental impact studies covering major portions of the pipeline route, on which more than $4-million has been spent. It involved 17 biologists and research assistants in 1971, and a force of 55 in 1972.

The route traverses the habitation of hundreds of thousands of caribou. Observations to date indicate that the buried pipeline will not bother them or the numerous other species in the area, which include moose, Dall sheep, bear, wolves, foxes and muskrat.

Noninterference with animal life is considered important not only from the standpoint of academic ecology but also for the sake of thousands of natives whose whole way of life is geared

to hunting.

More of a problem than the long-term operation of the pipeline is the potential disruptions during the construction phase. Roads and all other facilities have to be built on gravel pads, to insulate the permafrost from them. Gravel has to come mainly from streambeds. Studies are being conducted to avoid conflicts with fish life.

The pipeline will have to have booster stations every 50 miles to maintain the 1,680 pounds a square inch transmission pressure and the subfreezing temperature of the gas. The environmental research teams have even simulated electronically sounds that will come from these stations, to observe their effects on animals.

The gas syndicate has established a nominally autonomous advisory panel of outside experts, six scientists and two engineers, to scrutinize all environmental aspects of the project. One of the requirements the panel has emphasized is education of construction personnel in the ecological fragility of the area.

To date, the sponsors' assessment is that environmental disruptions can be kept minimal. They say the pipeline will take up only 40 square miles out of the Canadian Northwest Territories' total land area of 1.3 million square miles—"relatively no more than a string of thread across the length of a football field."

The 26-company syndicate, organized as the Arctic Gas Study Company, has just completed soil soundings of two alternate routes for the initial segment of the pipeline heading eastward from Prudhoe Bay.

The more direct route would cross the Arctic National Wildlife Range, a Federal preserve on Alaska's north coast, which conservationists are objecting to. The other route would start southward through the Brooks range of mountains and skirt the southern boundary of the wildlife range.

When a route has been selected, there will begin the process of getting approval for the project from the numerous Canadian and United States governmental agencies concerned. The current speculative target date for completion of the line is 1979.

Volcano on Mt. Pavlof In the Aleutians Erupts

COLD BAY, Alaska, Nov. 14 (AP)—Lava erupted 200 to 300 feet into the air from 8,215-foot Mount Pavlof in the Aleutian Islands today, the National Weather Service reported.

It was the first eruption of the volcano since 1956, the weather station in Cold Bay reported. Flames erupting from the mountain cone were visible at the station 31 miles east of the volcano.

The weather service said that a pilot who had flown over the mountain reported the molten rock did not appear to threaten any residents of the sparsely populated area.

A spokesman for the Palmer National Oceanic and Atmospheric Administration Observatory said that the eruption might continue for weeks.

Scientists Record Milestone

Florida State University oceanographers have established a milestone in research by capturing sea animals on the ocean floor at 1,800 meters (more than a mile deep) and bringing them to surface alive for the first time.

Dr. R. J. Menzies, Florida State professor of oceanography, organized the research team that worked from an arctic ice island. The project was conducted with support from the Office of Naval Research.

Dr. Menzies said the purpose of the research is to gain understanding of how animals are able to withstand changes in pressure. He explained that death of animals brought up from such depths had previously been attributed to mechanical damage, thermal shock or decompression.

"But in 1957 a Norweigan oceanographer, Anton Bruun, advanced the theory that temperature rather than pressure made recovery of the creatures impossible," Dr. Menzies said.

Operating on Brunn's theory, Allen Paul, one of Dr. Menzies' graduate students, succeeded in capturing live animals from a depth of 1,800 meters off the northern coast of Canada. However, no experiments were conducted on these animals. Dr. Menzies followed with a research group and captured numerous amphipods (shrimp-like crustaceans) and kept them alive.

These specimens were flown 1,000 miles away to the Naval Research Laboratory in Point Barrow, Alaska, where tests on the creatures were performed in pressure chambers. Some of the specimens were subsequently flown to the University of North Carolina for further testing.

Dr. Menzies pointed out that the experiments revealed the unexpected discovery that deep sea animals are more sensitive to pressure changes than specimens taken from shallow arctic waters.

Energy Shortage Provides Business for Arctic Flyers

Reuter

FROBISHER BAY, Northwest Territories—For an airline servicing the eastern Arctic, the energy crisis may eventually mean more business.

Much of the search for new North American reserves of oil and natural gas has shifted to Canada's north, and regional and smaller air services that operated on tight profitability margins in the 1960s see brighter days ahead.

Passenger and cargo traffic has increased as men and supplies are flown into the Arctic for exploration of minerals and fossil fuels. Gas has been found on islands in the central high Arctic and, although reserves are still below an economic volume, studies are being made for a possible pipeline down the east or west side of Hudson Bay.

This is all happening along the eastern flank of the Arctic, apart from more encouraging advances in the west around the Mackenzie River where plans for five-billion-dollar gas pipeline are in the final stages.

"We have great faith in the north," says James Tooley, chairman of Nordair Ltd. of Montreal, which operates 23 aircraft and has six scheduled flights a week into this hamlet on Baffin Island, 1,300 miles north of Montreal.

Three flights weekly go on to Resolute, on Cornwallis Island 600 miles above the Arctic Circle and 2,200 air miles north of Montreal.

Nordair ranks second among Canada's five major regional airlines in gross revenue, behind Pacific Western Airlines of Edmonton, Alberta, which also flies to Resolute. It was the first, in late 1968, to introduce scheduled jet service to the Arctic.

Nordair's total revenue has more than tripled to $21,671,000 in 1972, from $6,719,000 in 1968. Tooley expects it to hit $28 million this year.

A rise in earnings to $969,000 in 1971 was reversed last year when strikes were called by air traffic controllers and Nordair ground personnel. Earnings fell to $763,000

Bank of America Named Alaskan Land Claims Agent

SAN FRANCISCO, Nov. 15 (UPI)—The Bank of America, the nation's largest, was selected yesterday as distribution agent of land-right claims to 17,000 Indians, Eskimos and Aleuts in Alaska.

Passed by Congress in 1971, the Alaska Native Claims Settlement Act provides compensation of 40 million acres of land and $962.5 million to Alaskan natives as compensation for claims against the United States Government.

Sealaska Corporation was named by the government to oversee distribution of claims.

John Borbridge Jr., president and chairman of the board of directors of Sealaska, announced yesterday that the Bank of America would act as distribution agent.

The bank will supervise distribution of 100 shares to each eligible enrollee under the act. Then Sealaska will begin cash distributions under provisions of the act.

Nuclear Reactor Is Supplying Power to Arctic Region

The New York Times

MOSCOW, Oct. 20 — The Soviet Union disclosed today that the world's first nuclear reactor within the Arctic Circle was now supplying millions of kilowatt-hours of electricity each month to the underdeveloped polar regions around Murmansk.

The reactor has reached a production capacity of more than 300,000 kilowats, three-quarters of its potential, since it was put into operation last June.

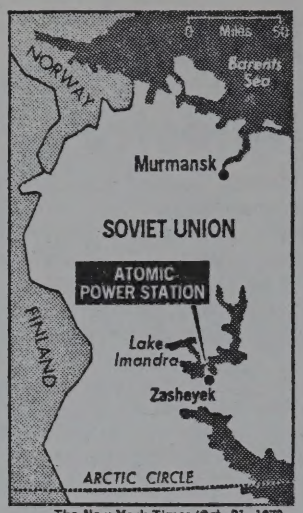
According to an article that appeared today in Pravda, the Soviet Government's newspaper, the reactor is expected to be operating at full capacity by the end of the year, following the completed construction of a transformer substation.

The power plant, which is on the Kola Peninsula, of northern European Russia, will eventually include two such reactors, each with an anticipated capacity of 44,000 kilowatts. Construction of the second reactor is in progress, according to Pravda, at a cost thus far of more than 22 million rubles, or nearly $30-million.

Within a year, the second reactor is also expected to deliver electricity to industries, mines and construction sites in the Arctic.

A high-voltage transmission line has been under construction to take some of the power south toward Leningrad.

While the article did not give details on where the existing power was being used, several references indicated that the electricity was needed in the industrial region of Murmansk, which lies at the northern end of the Kola Peninsula.



The New York Times/Oct. 21, 1973

The new nuclear plant is crucial for the economic development of the region, which offers a wealth of mineral resources but lacks sufficient raw fuels to help exploit them.

Hydroelectric resources, which supply about four-fifths of the area's electricity, have nearby reached their limit. The output of the successful nuclear plant should virtually eliminate any need to haul such conventional fuels as coal or oil vast distances across the tundra.

The high priority that the Soviet Union has attached to nuclear energy as a means of unlocking natural resources in the Arctic was underscored further in Pravda today by a Page 1 statement by the Central Committee of the Communist party and the Council of Ministers. The article itself appeared on the newspaper's second page.

In the formal statement, the Soviet leadership congratulated the construction workers, engineers and technicians for their "successful mastery" of the power plant operation, describing ie as "a considerable contribution to the fulfillment of the task of the five year plan."

The plan calls for the Soviet Union to increase its power-generating capacity by six to eight million kilowatts between 1971 and 1975.

While praising as "selfless" those who have built and operated the nuclear plant, the Pravda article also acknowledged that construction had been hampered by the irregular delivery of key material, as well as by inhospitable Arctic conditions.

The Kola project, which consists of conventional water-reactors generating steam for power turbines, is located on a small peninsula protruding into Lake Imandra, just north of the town of Zashavek.

ARCTIC PEOPLE MEET AND ASK RIGHTS BILL

The New York Times

COPENHAGEN, Denmark, Nov. 25—The first Arctic peoples' conference ended here today with a call for recognition of the rights of minority races.

Indians and Eskimos from Canada, Greenlanders and Scandinavian Lapps proposed what amounted to a bill of rights for the indigenous people of the Arctic.

The 40 delegates also agreed to name a working committee to prepare plans for a permanent organization of Arctic peoples. The committee will consist of delegates from Canada, Greenland and the Lapps of Scandinavia. A place was left open for an Alaskan representative.

"We are an integral part of the very lands and waters we have traditionally used and occupied," a resolution declared. "Our identity and culture is firmly rooted in these lands and waters. We request the obvious: that the Government of each state from which we come recognize our rights as peoples entitled to the dignity of self-fulfillment and realization."

For many at the conference, their bond was a strong concern that the resources of the Far North would be developed without the consent or participation of the native peoples.'

Soviet Launches 2d Atomic Icebreaker

By THEODORE SHABAD

The New York Times

The Soviet Union has quietly launched its second nuclear-powered icebreaker in a bid to keep a growing volume of shipping moving along the nation's icebound coasts at a time of expanding foreign trade.

The new ship, the Arktika, described as larger and more powerful than the 16,000-ton Lenin, the first atomic icebreaker, is being outfitted at a Leningrad shipyard and is scheduled to be completed in 1975, at the end of the Soviet Union's current five-year plan.

The Russians look to a growing fleet of modern icebreakers to keep the Arctic seaway along the north coast of Siberia open all year round, at least in its rapidly developing western portion. The route is normally open only from July to November.

Izvestia, the Soviet Government newspaper, in announcing the launching of the Arktika, said the operation of nuclear icebreakers had been found safe and economical since the Lenin began clearing Arctic sea lanes in 1960.

Although the creation of an entire fleet of atomic icebreakers had been predicted by the Soviet Union when the Lenin was still on the ways in 1957, actual construction has been delayed pending performance studies of the Lenin and the development of more economical marine nuclear reactors.

In February, 1970, Izvestia said that two icebreakers of an Arktika series would be built, and described them as "twice as powerful" as the 44,000-horsepower Lenin.

No details on the Arktika reactors were disclosed, but the Soviet daily said they would be adequate to keep the icebreaker at sea for five years until a recharge of uranium was required. The Lenin must be refueled every two years.

Soviet press reports have given few statistics about the design of the Arktika. She is said to be 460 feet long, with a 100-foot beam, with a displacement of about 25,000 tons. The Lenin is 440 by 90 feet, for her 16,000 tons.

The reactor room of the Arktika was described by Izvestia as large enough to accommodate a 10-story building of the prefabricated module type common in the Soviet Union. Outfitting of the hull, including installation of the reactors and engines and construction of the superstructure, is under way at Leningrad's Baltic Shipyard, according to the Soviet daily.

The Northern Sea Route, as the Arctic sea lane along the Siberian coast is called, is used to supply northern outposts and mining centers and, if ice conditions permit, to carry freight betwen northern European Russia and the Pacific.

The western portion of the sea route has assumed growing significance in recent years with the expansion of the copper and nickel operations at the Norilsk complex. Special efforts have been made to keep the seaway open as long as possible to carry ore concentrates from Norilsk to smelters in the Kola Peninsula around Mumansk.

The contruction of additional icebreakers is likely to put the Soviet Union in the forefront of nuclear-powered merchant shipping. The United States nuclear freighter Savannah, launched in 1959, was taken out of service in 1971 after technical problems and uneconomical operation and survives as a floating museum for the city of Savannah.

The West Germans completed a nuclear ore carrier, the Otto Hahn, in 1968, and Japan put the nuclear cargo ship Mutsu into service earlier this year.

another ice age may be on the way—sometime

By David F. Salisbury
Staff correspondent of
The Christian Science Monitor

Seattle, Wash.

"Another ice age is coming," many climatologists forecast. But no one really knows what might bring the glaciers crashing down. Dark clouds from outer space, volcanic dust, a dramatic break-up of Antarctic ice, and, most recently, air pollution, are some of the possible "triggers."

One of the longest-held theories, though, involves the Arctic ice cap. The physical characteristics of this fragile lid are very different from those of the ocean it covers — even slight changes in wind and temperature might cause great alteration in its position and extent. And a drastic change could initiate a series of events that would convert the earth's climate from warm to cold.

To see whether or not the north polar cap could play such a role is the goal of a research program at the University of Washington. AIDJEX (pronounced Ajax), Arctic Ice Dynamics Joint Experiment, is planning the most sophisticated scientific assault ever made on the North Pole. This effort — undertaken in cooperation with Canada — will lay the groundwork for a U.S.-Russian experiment in 1977.

Because the ocean and atmosphere respond to changes very slowly, the earth has many possible climates, explains Dr. Norbert Untersteiner, director of AIDJEX. The same may be true of other planets.

For example, the Mariner 9 pictures from Mars show that water once flowed freely on the surface of the red planet. This indicates that Mars may once have had a nearly earth-like climate, and is now undergoing its equivalent of an ice age.

The main question is, "Just what conditions cause such a major climatic change?"

Dr. Untersteiner and his colleagues have already spent some time in the harsh Arctic conditions in an attempt to come up with the answer, at least as far as the Arctic is concerned. They carried out a pilot experiment running from February until May in 1972 to test equipment and procedures.

As a result of that experiment, AIDJEX scientists can describe how the ice responds to changes in wind, temperature, and current. And they are finding that flow ice acts not like a plastic solid, but more like pebbles grinding together.

AIDJEX scientists plan to return to the Arctic for a full year in 1975. Around their four camps will be a gridwork of buoys monitoring wind; ice, water, and air temperatures; and ocean currents. These buoys are tough; several of those placed in 1972 are still operating despite storms, drifting ice, and temperatures of 50 below zero.

The outermost buoys will form a "boundary." Within this area, Dr. Untersteiner and his colleagues will record the response of the ice to different conditions. They hope this will yield the first accurate picture of ice dynamics.

Then, after POLEX, the Soviet-U.S. experiment, studies how ice interacts with land and open-ocean, a computer model of the ice cap will be developed.

The Russians have long had an active Arctic program. However, they have not used as sophisticated equipment — satellite-interrogated buoys and laser-ranging devices — as the Americans.

The Soviets want the computer model to predict ice movement and areas of pressure build-up. Most of their ocean ports are on the Arctic and they want to keep their northern shipping lanes open as long as possible.

Likewise, the U.S. Federal Maritime Administration funds a portion of AIDJEX because it hopes to learn more about designing ships and maintaining shipping lanes across the North Pole.

20 moose are 'wired'

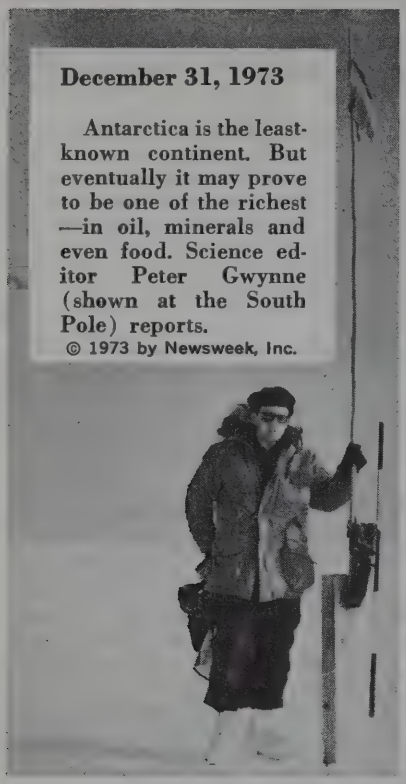
Twenty moose fitted with radio collars in the Alaska Range are now being tracked by Alaska Department of Fish and Game aircraft.

"The transmitters are working as intended. We have had no difficulty in locating all 20 animals we had fitted with transmitters earlier this month," said John Coady, the Department of Fish and Game moose biologist in Fairbanks. Coady intends to follow the movements of the 17 cows and three bull moose for at least the next 11 months. The collars weigh four pounds each. They are carefully designed not to cause discomfort or inconvenience to the moose that are wearing them.

Radioed moose on the north side of the Alaska Range are easy to spot. They are the only moose in Alaska presently wearing white neck collars with a bright yellow knob on top.

NO COLLAR FOR HIM—Fish and Game has collared 20 moose with radios, but passed up handsome specimens like this. There's no point in collaring a trophy animal because someone will shoot it, hurting the study and probably losing the expensive radio.

(ADF&G photo)


December 31, 1973
Antarctica is the least-known continent. But eventually it may prove to be one of the richest —in oil, minerals and even food. Science editor Peter Gwynne (shown at the South Pole) reports.
© 1973 by Newsweek, Inc.

McMurdo mail drop

A Royal New Zealand Air Force P-3 Orion flew mail July 31 to 132 U.S. Navy personnel and eight civilian scientists who are wintering at McMurdo Station. Mail also was dispatched, via ground transportation from McMurdo, to the 11 scientists and others who are stationed at nearby Scott Base (N.Z.).

The unprecedented austral night mail delivery was accomplished by making low passes over McMurdo and dropping the mail into a lighted area, following a 2,300-mile flight from Christchurch, N. Z. After completing its mission the plane made its way directly back to Christchurch. Included in the drop were small packages (some containing medicines and other vital materials), first class letters, tape recorded cassettes, large envelope mail, magazines, and other official mail.

E. Everett MacNamara Dies

E. Everett MacNamara, 35 year-old polar pedologist and assistant professor at Lehigh University, died in a plane crash near Buffalo, New York, on December 16, 1972. Dr. MacNamara served as the National Science Foundation's exchange scientist with the 12th Soviet Antarctic Expedition, 1966-1968. Prior to his antarctic service he worked for three field seasons in northern Alaska.

ANTARCTIC JOURNAL

SCIENCE

Photos by Ralph Payne—U.S. Navy

Fauna: Emperor penguins and a fish equipped with its own antifreeze

The Frozen Continent

At the bottom of the world, separated from the nearest land mass by hundreds of miles of icy seas, lies Antarctica, a forbidding continent of perpetual cold, awesome mountains, huge glaciers, whistling gales—and a rapidly proliferating number of scientific-research bases. This month, at the height of the nightless antarctic summer, NEWSWEEK SCIENCE editor Peter Gwynne visited those bases and filed this report:

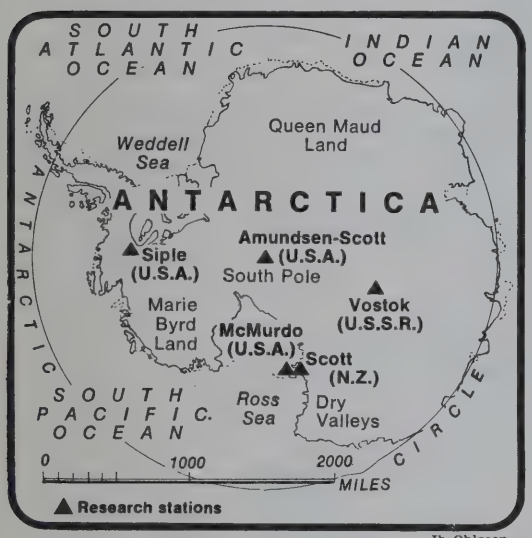
Antarctica is not always what it seems. It is by far the most frigid area on earth, but receives so little fresh snow that it is geographically classified as a desert. Although 98 per cent of its land is covered by centuries-old ice, one of the most intractable problems for humans there is to obtain fresh water. It is a land virtually bereft of indigenous life, yet the freezing seas around it teem with a biological bounty of all shapes, sizes and species. The romantic age of antarctic exploration —the era of Amundsen, Scott, Shackleton and Byrd—may be over, but the age of hard-headed scientific investigation of the continent has barely begun. Along with the penguins, seals and skua gulls, scientists are now becoming natural inhabitants of the southernmost continent.

At least twelve nations are engaged in an immense variety of research projects. Meteorologists are studying unpredictable antarctic weather patterns, hoping to find a key to accurate worldwide weather forecasting. Marine biologists believe that the ocean life around the continent can contribute greatly to the world's food supply. Environmentalists see the pristine antarctic environment as a perfect baseline against which they can measure the effects of man's pollution in populated areas. Perhaps most important of all, geologists drilling both on land and under the sea are now convinced that the area contains huge resources of oil, natural gas and minerals.

Much of the scientific work at the antarctic stations is concerned with weather observations, which provide important additions to those made by meteorological stations all over the world. But the antarctic weather is also of interest in itself: a number of experts believe that the earth's geographic poles act as "heat sinks," through which the atmosphere gets rid of the heat that collects in the tropics. This antarctic summer, Dr. Michael Kuhn of the University of Innsbruck in Austria is taking measurements at the U.S. South Pole station to test this theory and investigate the influence of the antarctic on weather all over the globe.

Mysteries: By far the most intriguing feature of the continent is the dry valleys, a 4,000-square-mile area of snow-free, chocolate-colored hills. In some way not completely understood, the floor of the valleys is heated, and on bright days one can lie there quite comfortably in a bathing suit and even get a suntan.

Points of interest: From ice caves to lakes with water at 80 degrees



Ib Ohlsson

Just as mystifying are the lakes in the dry valleys, each of which seems to have a unique chemical composition. At the bottom of one lake, Vanda, the water temperature is nearly 80 degrees Fahrenheit, even though the lake is covered by 12 to 15 feet of ice; volcanic activity is one possible explanation. In another, Don Juan Pond, the water is so salty that it does not freeze even at minus 70 degrees, more than 100 degrees below the normal freezing point.

In hopes of understanding these unusual geological features, an international group of scientists financed by the U.S. National Science Foundation and supported by the U.S. Navy is drilling a series of holes into the rocks around and beneath the lakes. The cores from one hole, bored through the ice and water of Lake Vanda into the sedimentary rock beneath the lake, show clear evidence of marine fossils, indicating that in the past this part of Antarctica was a marine fjord with a relatively mild climate.

The researchers at the dry-valley drilling project take great pains to preserve the environment in pristine condition. Every trace of human occupation, be it food, cigarette ash or body wastes, must be removed from a site on completion of the project, and drillers are under orders to mop up every drop of lubricant that they spill. The reason is that the ecology of the dry valleys is unusually vulnerable. "It's so simplified that it would have a hard time coping with any new environmental factor introduced," explained Russ Donlan, an environmental monitor who continually checks the cleanliness of the drilling operation.

The dry-valley project is just one of a number of antarctic drillings either planned or completed. Drilling in the Transantarctic Mountains indicates the presence of copper deposits and possibly other metals. The research vessel Glomar Challenger, drilling off the Ross ice shelf last February, struck methane and ethane—almost certain indicators of oil and natural gas. "There seems little doubt that the antarctic contains large oil and mineral resources," declares Dr. Samuel Treves of the University of Nebraska.

Food: In immediate practical terms, the most promising antarctic resource is the sea rimming the continent. Marine biologists regard many of the species native to the chilly seas as possible answers to the world's food shortage. Dr. Arthur L. DeVries, an oceanographer from the Scripps Institute of Oceanography, has discovered that some antarctic fishes produce their own biochemical antifreeze. He hopes to isolate this chemical, then see if it may be synthesized to help preserve such substances as blood and milk. DeVries's most useful subjects for his antifreeze studies are the 150-pound codlike *Dissostichus mawsoni*, which are winched up on a fishing line from depths of around 1,600 feet.

Dissostichus mawsoni happens also to be a tasty fish, but a more promising food source is the krill, the tiny, shrimplike antarctic shellfish that provides much of the raw diet of killer whales and seals. At present, little is known about the behavior or numbers of these creatures in antarctic waters. But starting this month, a group from DePaul University headed by Dr. Mary Alice McWhinnie plans to study their metabolism and seasonal movements with the ultimate aim of determining their eventual food value.

Emperors: No antarctic study would be complete without reference to emperor penguins, the tall, tuxedoed birds that swim like fish and walk like 50 kilometer Olympic champs. At McMurdo Station, Michael Fedak and Berry Pinshow of Duke University are studying the penguins' expenditure of energy when they walk the 50 miles or so from the sea, their only food source, to their rookeries on the ice at mating time. In a project designed to determine how the emperors' metabolic systems work in the 50-below temperatures during their breeding time in the antarctic winter, the Duke researchers equip penguins with masks that measure their intake of oxygen and output of carbon dioxide as they walk on a treadmill. Fortunately, the penguins are fearless, friendly birds, and they take to the experiments with few complaints.

What is so special about research in Antarctica is the unforgiving nature of the environment. During the week that I visited the continent, Dr. Wolf Vishniac, an eminent U.S. microbiologist who was perfecting instruments to detect life on Mars in the earthly environment most similar to that of the distant planet, fell to his death from a 500-foot ice shelf, and the antarctic scenery is littered with the remains of helicopters and airplanes that have crashed for one reason or another.

Loneliness: The scientists themselves are generally younger than similar groups in the U.S. For those who winter over—that is, spend the six-month winter on their research project—the National Science Foundation takes special care to select sober-minded, careful men and women; every winter each candidate must undergo a psychological screening, as well as a thorough physical, to qualify him or her for the months of isolation.

But in addition to its hardships, the antarctic is also notable for its tranquillity—the isolation both from large centers of population and from weapons, as mandated by the 1959 antarctic treaty. According to that treaty, which has been ratified by eighteen nations, Antarctica is to be devoted to peaceful studies; and over the years all the nations with bases on the continent have pursued that goal in both letter and spirit. Each year since the International Geophysical Year got under way in 1957, for example, a Soviet scientist has spent time at an American scientific station, while an American scientist has lived at a Soviet outpost. The result is another important antarctic achievement—the realization that, in a part of the globe where all the elements are pitted against them, men can work together to understand and overcome their common problems.

Antarctic duty for woman officer

Women in the United States Navy have been assuming more important roles, becoming boatswain's mates, deck hands aboard ships, construction Seabees, and even pilots. Now, the first woman has reported for duty with the United States Navy support force in Antarctica.

She is Lieutenant Ann E. Coyer, who will fly south on October 31 to McMurdo Station where she will spend the summer as administrative officer.

When Lieutenant Coyer reported to the support force on August 27, all she had to do was change offices within the same building. "I just walked down the hall and up the stairs," she said of her job change from administrative staff officer at the Davisville Seabee Centre to administrative officer of the support force at Davisville, Rhode Island.

Asked if she had volunteered for Antarctic duty Lieutenant Coyer said: "I returned from leave and found my billet had been eliminated. I knew the support force administrative officer was retiring, and so I looked into the possibility of getting his job." A call to the Pentagon in June resulted in her assignment to the support force.

Lieutenant Coyer graduated from the Officer Candidate School at Newport and was commissioned an ensign in 1961, after working her way through Le Moyne College in her home state of New York as a registered X-ray technician.

During her career, Lieutenant Coyer has held a succession of posts up and down the east coast of the United States, as communications officer at Cecil Field, Florida, and at the Naval Shipyard, Portsmouth, New Hampshire. Her administrative posts were at Lakehurst, New Jersey, and Davisville before reporting for duty with the Antarctic support force.

Lieutenant Coyer's off-duty time during her Navy career has been occupied with a different hobby at each duty station. She played golf in Florida, obtained her amateur radio licence while at Portsmouth, spearheaded a self-help rejuvenation project at the Lakehurst Wave barracks, and earned her private pilot's licence at Quonset Point where she became president of the Quonset Point Flying Club.

LIEUTENANT COYER

She had reported to the Rhode Island area with the intention of taking up sailing, she said, but changed her mind and took up flying.

The polar clothing Lieutenant Coyer will wear is far from the latest fashion. In fact, a full set of polar clothing, which everyone must wear in Antarctica, weighs almost 50lb—and it is impossible to match the bunny boots with one's parka hood, much less with a purse.

"I'm unalterably opposed to women wearing greens," she said.

Lieutenant Coyer recently filled out the requisition for her own Antarctic clothing which included Seabee greens. "It's just not the same as ordering from Filene's or Jordan Marsh," she said.

Women have gone to the Antarctic in recent years as scientists, laboratory technicians, field assistants, and journalists, but Lieutenant Coyer will be the first Navy woman to serve in Antarctica.

She will not be alone this year, however, as four women scientists will be conducting research projects during the summer, from October to February.

The United States Navy's first woman to go to the ice says of her assignment: "It will be challenging but not just because Antarctica is a unique place."

Whale Kisses Too Hard

DUDLEY, England (AP)—Cuddles, a killer whale at a local zoo, misgauged its daily kiss for Roy Lock, its trainer. The whale put too much feeling into the gesture. Mr. Lock had to be taken to the hospital with a broken nose.

Grant for Sea Study

WASHINGTON, Dec. 16 (AP)—A grant of $415,000 to the University of Alaska for marine research was announced today by the National Oceanic and Atmospheric Administration.

ISOLATION ENDS FOR SCIENTISTS

Dec. 1

Almost a year's isolation for four scientists at Antarctica was ended in the early hours of this morning when a Hercules aircraft landed at Siple Station.

Siple Station is the most remote of the American bases in the Antarctic and is situated at the foot of the Sentinel Mountains in Ellsworth Land.

The four scientists were left at Siple Station last February and they are the smallest group to spend the winter in the Antarctic since 1934.

The first to leave will be the base doctor, Dr R. W. Threlkeld, who will return to McMurdo tomorrow. His three companions, Messrs W. J. Trebucco, J. Klinck and E. Paschall, will follow in nine days time.

FLIGHTS TO ICE

Fresh food delivered

Sept. 4

Two United States Navy ski-equipped Hercules from Christchurch landed on the ski-way at Williams Field, McMurdo Sound, yesterday morning delivering the first fresh provisions to the station and Scott Base for five months.

The two Hercules took south 26 passengers, scientists and construction workers, and 6000lb of cargo, including milk and fresh fruit and vegetables.

The first aircraft left Christchurch Airport at 2.30 a.m. and the second 30 minutes later. They landed at Williams Field at 10 a.m. and 10.45 a.m. respectively.

The weather was reported to be "beautiful," with visibility for 40 miles, a 10 knot south-easterly wind, and a temperature of -21deg.

Both aircraft were airborne after having been unloaded and refuelled, and they landed at Christchurch Airport at 7.38 p.m. and 8.50 p.m. yesterday respectively.

If there is no change in the weather at McMurdo Sound the Hercules will make their second flights south to the Antarctic early tomorrow morning. Twenty-four passengers and a further 6000lb of cargo will be carried.

Jamesway hut in the shadow of South Pole Station's geodesic dome.

U.S. Navy

Dec. 11

Long hours are being worked by members of the United States Navy at the Amundsen-Scott South Pole station, 3205 miles from Christchurch, as work progresses on a 50ft high, 164ft diameter geodesic dome and tunnels — one shown above—which will replace the station built in 1956.

The new complex is costing more than $3.5m.

Members of the U.S. Navy's Operation Deep Freeze project and several scientists are expected to spend the winter of 1975 in the dome.

Three buildings—which include a laboratory, a post office and a library and meeting hall—are being built under the dome.

Tunnels lead from the dome. One will go to a laboratory and a lounge. Another, 726ft long, 44ft wide, will house a workshop, generator and general storage area.

About 120 men are now working on the complex.

A spokesman for Operation Deep Freeze said at Christchurch Airport today that all equipment for the new station had to be flown the 840 miles from McMurdo station.

Since early last month 80 Hercules flights have been made to the South Pole.

Another 55 are planned to mid-February when the station is evacuated by all but a small group of men who will winter over.

Last month 1,060,000lb of cargo was delivered to the South Pole station.

Nuclear power plant being dismantled

Dec. 11

Work on dismantling Antarctica's only nuclear power plant is well under way. The nuclear core and all associated radioactive materials will be shipped back to the United States at the end of the summer.

The work is being undertaken by 26 men of the Navy's Mobile Construction Battalion, the members of which are this summer engaged in a variety of construction projects at McMurdo Station and at the Amundsen-Scott South Pole Station.

According to a Navy spokesman at Christchurch Airport, the men working on the power plant are already two weeks ahead of schedule, and are beginning the removal of the protective shielding so that the nuclear core can be removed and prepared for shipment out aboard the last vessel to leave McMurdo Sound this summer.

The plant supplied McMurdo Station with electricity from March, 1962, until it was closed in September, 1972, because of possible corrosion. Since then, the station's power needs and water-distillation requirements have been supplied by a diesel-generating plant.

The expansion of this plant is the battalion's priority task at McMurdo Station this summer. It involves building a 32ft by 64ft addition to the existing generator building, which will house two 500kw, 26-ton generators in addition to the four already in use.

Besides the generator building, the construction men (Seabees) have completed a storage facility, an addition to the earth sciences laboratory, and the building of a 25ft sledge on which to transport cargo vans from McMurdo Station to the Williams Field ice runway seven miles away.

At the South Pole, 120 Seabees are working on the construction of several protective arch structures, each 44ft wide and varying in length, the longest being 324ft. Work is also proceeding on the galley, station crew's quarters, and a communications facility, all of which will be housed under the 164ft-diameter geodesic dome.

Soviet Ship Blasts Free Of Floes in the Antarctic

The New York Times

MOSCOW, July 24—The supply vessel Ob, flagship of the Soviet Antarctic fleet, has dynamited her way free after being trapped months in the ice and is heading home.

The Government press agency, Tass, reported today that her skipper, Sergei Volkov, radioed that the vessel was free. He said explosions and high winds broke up 16-foot floes.

The plight of the Ob, a diesel-electric supply vessel, was made public June 12, nearly two months after she had run into a severe storm.

She left the northern port of Murmansk last Dec. 4 with about 150 people and supplies for the curent Antarctic expedition. Sixty people were evacuated last month.

According to Soviet press reports, the enforced drift off the George V Coast enabled scientists aboard the Ob to make investigations of ice and weather in an area not normally accessible to vessels at this time of year, the winter of the Southern Hemisphere.

Antarctic drilling called off

Dec. 11

SCOTT BASE.

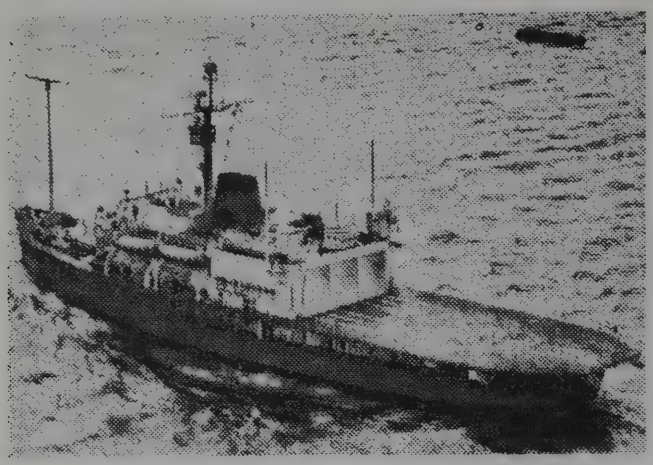
Officials have decided to call off drilling at Don Juan Pond in Antarctica because of the danger of disturbing the pond's natural environment.

A New Zealand drilling crew working for the project struck a granite boulder earlier last week about 11 feet underground on the shore of the lake. The drill rig was tilted at an angle to try to bypass the boulder, but granite was struck again.

The drillers then tried to penetrate the granite, hoping to reach softer earth, but water started to rise in the hole. Drillers believe they may have struck an artesian well.

The drilling was stopped because there was no way to control the overflow that might have contaminated the pond.

Don Juan Pond is considered to be the saltiest lake in the world, with a calcium chloride concentration of about 45 per cent. It is located in the Wright Valley, about 90 miles from Scott Base.



Fuji Leaves For Antarctic

Nov. 26

The 5,250-ton icebreaker Fuji left Tokyo Sunday morning with members of the 15th Antarctic expedition led by Masayoshi Murayama.

The ship is scheduled to arrive in Antarctic waters late in December by way of Fremantle on the west coast of Australia.

It will haul materials to the Japanese Showa Antarctic Base located on Ongul Island from January to mid-February.

The ship will also pick up the 30-member 14th wintering team after transporting the members of the 15th wintering team to Showa Base.

The Fuji is scheduled to leave the Antarctic waters for home in late February.

The ship is scheduled to call at Cape Town as in usual years for refueling before returning to Japan in April.

Pollution Study in Antarctic

PERTH, Australia (AP)—Forty Japanese scientists left for the Antarctic recently aboard the icebreaker Fuji to study pollution. Dr. Masayoshi Murayama said the Japanese had been studying pollution in the area since traces of insecticide were discovered in the bones of penguins five years ago.

Argentina's Capital: A Polar Island

BUENOS AIRES, Aug. 10 (AP) — Argentina's seat of government shifted briefly to a polar island today as President Raúl Lastiri and his Cabinet visited the country's disputed Antarctic territory.

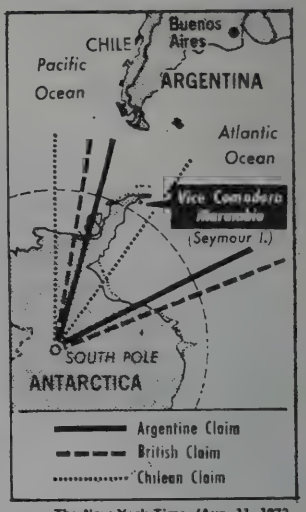
The wife of former President Juan D. Perón went along.

The party flew 2,600 miles to Vice Comodore Marambio air base (Seymour Island) to celebrate Air Force Day.

Argentina claims an Alaska-sized wedge of Antarctic territory reaching the South Pole. Chile and Britain claim the same land, and Brazil has shown interest.

"My presence here reaffirms our national sovereignty over these southern regions," said Mr. Lastiri in a speech to airmen.

The visit lasted three hours.



The New York Times/Aug. 11, 1973

Fumes poison Antarctic men

(Special Correspondent N.Z.P.A.)

SCOTT BASE, November 27.

Two members of a Victoria University field party camped on Shapeless Mountain, at the edge of the Antarctic Plateau, suffered carbon monoxide poisoning early this morning.

The men, Russell Plume, a geologist, of Wellington, and Ken Blackwood, the field leader, of Dunedin, were later taken by helicopter to the United States Navy hospital at McMurdo Station, where they were treated and discharged.

Later, at Scott Base, Mr Blackwood said they were in their tent on top of the 9000 ft mountain, melting ice for water on their kerosene-fired stove.

"I only remember the passage in the book I was reading, and feeling intoxicated and ill," he said. "I crawled out of the tent and yelled to Russell to get out, or I would drag him out. When we were both outside, we were crying and stumbling about."

The other members of the party, Mrs Janet Crump and Mr Graham Rowe, were awakened by the commotion. They dressed the men in protective clothing, walked them about for an hour to clear the poison from their systems, and treated them for shock. After Mrs Crump radioed Scott Base for help, a helicopter was sent.

Both men are expected to return to Shapeless Mountain.

Australia rebuilding bases in Antarctic

Dec. 8

Australia's Davis Station, on the Budd Coast of the Antarctic, will be rebuilt in stages over the next five years at a cost of about $800,000.

Mr A. Humphreys, an engineer with the Australian National Antarctic Research Expedition, said in Christchurch that this was part of a rebuilding programme for Australia's bases on the continent which began at Casey Station in 1969.

He said Davis Station would be a new concept, but built on the existing site. The first building, a biology laboratory, will be erected this summer.

When Davis Station was built in 1957 as a weather station it housed four men. This year there are 14, and the station is the base for the expedition's biological research programme.

Unlike Casey Station, where all the buildings are interconnected, the new Davis Station will have three basic buildings to house science, workshop, and a central or core area.

Mr Humphreys said it had been found that in an interconnected building the occupants seldom went outside into the fresh air.

Mr Humphreys is in Christchurch at the invitation of the superintendent of the Antarctic Division of the D.S.I.R. (Mr R. B. Thompson) to have exchanges and discussions on the general running and support procedures of the New Zealand expedition.

As Mr Humphreys is an engineer, he will also study the rebuilding plans for Scott Base. He will leave for the Antarctic today.

Antarctic TV

CHRISTCHURCH, New Zealand (AP) — McMurdo Station, Antarctica, has begun its own closed-circuit television programming. The TV facility broadcasts 62 hours a week and is capable of producing its own live programs.

Antarctica Laboratory Dedicated to UW Man

The earth sciences laboratory at McMurdo Station, Antarctica, was recently dedicated to former University of Wisconsin-Madison professor, Edward C. Thiel.

Thiel, who taught geophysics in the late 1950s, was killed in an aircraft accident on Antarctica in 1961.

Fuel contract

Dec. 11

Each January the giant tanker Maumee takes 6m gallons of fuel from the United States to McMurdo Station.

When the Maumee berthed at Winter Quarters Bay last January the support force had exactly one week's supply of fuel left in the tanks.

Now that the nuclear power plant is being dismantled, the extra diesel generators will need a supply of fuel. During the 10 years the nuclear plant was working it produced 78m kilowatt hours of electricity and 13m gallons of fresh water. The energy it produced was equivalent to about 4.5m gallons of diesel fuel.

McMurdo Station has more than enough fuel to last beyond the scheduled arrival of the Maumee in January, but United States Navy officials are watching fuel conservation measures at the base. The tanks are about half full, and must be replenished this summer if the Antarctic programme is to continue without interruption.

Navy officials are anxiously awaiting word that a contract to supply the 6 million gallons of fuel has been let.

It is thought that the oil companies might be reluctant to sign a contract when the price of fuel is expected to increase. There is also the question of how high the National Science Foundation might be willing to bid if prices start soaring.

The supply contractors have told the Navy that they expect to obtain fuel soon from the Caribbean, as in the past, or from a United States east coast terminal. But negotiations are continuing.

If fuel is not available the American bases in the Antarctic may be closed during the winter (and if this happens then Scott Base is likely to close also), or some summer research projects may be curtailed.

However, the main concern is about the planning of future activity on the continent.

The Naval Support Force is evaluating its energy practices, to determine whether its present uses are the most efficient ones. The new programme will re-emphasise conservation measures that have become routine over the years, search for new ways to conserve fuel, and attempt to make energy conservation the task of every individual.

These measures include switching off all lights not in use, lowering thermostats in buildings, and flying at the most economical speeds and altitudes. So far no flights have been cancelled or postponed because of the fuel situation.

Trans-polar flight ends

BUENOS AIRES, Dec. 7.

An Argentine Air Force Hercules transport aircraft landed at the Fairburn R.A.A.F. base, Canberra after the first trans-polar flight from South America.

The aircraft, captained by Brigadier-General Hector Luis Fautario, Commander-in-chief of the Air Force, had a crew of nine officers. It left Buenos Aires on December 4 and refuelled at Vice-Commodore Marambio air force base on Snow Hill Island off the Antarctic Peninsula yesterday.

co-operation urged

Dec. 8

Professor E. M. van Zinderen Bakker, the director of an institute for environmental sciences at Orange Free State University, said that scientists did not recognise any boundaries, and in this regard were in a unique position to help solve some of the world's resource problems.

"The answers lie in carefully planned research of areas in the Antarctic and sub-Antarctic before any attempt is made to put these resources to practical use."

Professor Bakker, who is in Christchurch to attend the ninth congress of the International Union for Quaternary Research, said that New Zealand's record of scientific effort in the Southern Hemisphere was of great importance.

"New Zealand has contributed much to science, and the work being done by your people has a high international reputation," he said.

Willis L. Tressler

Dr. Willis L. Tressler, 69, former oceanographer and Antarctic researcher, died Sept. 9, after a stroke in Grand Lake, Colo., where he had lived since retiring from the U.S. Naval Oceanographic Office here in 1965.

Formerly a resident of College Park, Dr. Tressler held numerous scientific positions with the federal government and participated in a number of major expeditions to Antarctica.

These included the U.S. Navy Antarctic Expedition in 1954-55 and Operation Deep Freeze in 1956-57, observance of the International Geophysical Year in 1958-59, when he was science leader at Wilkes Station, and the research program at McMurdo Sound in 1959-61.

Earlier, in 1954, Dr. Tressler was with the Canadian-U.S. Expedition to the Beaufort Sea in the Arctic.

Born in Madison, Wis., Dr. Tressler attended Colorado College and received his bachelor's and master's degrees and doctorate from the University of Wisconsin.

While a professor at the University of Buffalo from 1930 to 1940, he went to the Philippines to study tropical lakes there under the auspices of the Rockefeller Foundation.

Dr. Tressler was a professor at the University of Maryland from 1940 to 1946, but during this time was granted leave to serve with the Office of Strategic Services. After the war, he was with the newly formed Central Intelligence Agency until 1950, when he joined the Naval Oceanographic Office.

In 1962-63, he was director of education and training at the oceanographic office.

Antarctic caretakers to act as guides

Sept. 8

Two Antarctic caretakers who will go to Cape Royds this summer will have an extra job—acting as guides to 90 American tourists who will visit McMurdo Sound in late December aboard the Lindblad Explorer.

The two men, selected from among a number of applicants from within the New Zealand Antarctic Society, are Messrs L. E. Kerr, aged 49, a schoolteacher, of Christchurch, and G. E. Madgwick, aged 60, a business administrator, of Wellington.

Mr Kerr is a member of the Otago branch of the New Zealand Alpine Club. He was a member of the Otago branch of the New Zealand Antarctic Society before coming to Christchurch and joining the Canterbury branch. He served in the Royal New Zealand Air Force in World War II and trained in Canada.

Mr Madgwick has had a lifelong interest in the Antarctic and is a long-standing member of the society's Wellington branch. He served in the New Zealand Army during World War II with the rank of captain. He also has been a keen alpinist.

Both men attended an orientation week for the New Zealand Antarctic Research team at Tekapo last month, run by the Antarctic Division of the D.S.I.R.

The superintendent of the division (Mr R. B. Thomson) said yesterday that the two men would go to the Antarctic in mid-December in order to be at Cape Royds while the Lindblad Explorer was in McMurdo Sound. Their job would be to see that the penguins and historic huts were not unduly disturbed by the tourist group, and to act as guides to the tourists.

The Lindblad Explorer will leave Bluff on December 22, and on her journey to the Antarctic will call at several sub-Antarctic islands. The ship is due in McMurdo Sound on January 6, and the tourists will visit Scott Base the next day. After the ship leaves McMurdo Sound, she will sail round the continent to the Antarctic Peninsula, where she is due on January 16. The cruise will end at Punta Arenas, Chile, on January 25.

Two further cruises by the Lindblad Explorer to the Antarctic Peninsula will follow this summer. Both will start and finish at Punta Arenas.

Australia Sets New Definitives For Use In Antarctic Territory

Twelve new definitive stamps for use in Australia's Antarctic Territory will go on sale at Post Office philatelic sales centers beginning Aug. 15, ANARE bases in the Antarctic and Macquarie Island will receive stocks early next summer.

E. F. Lane, director general, Posts and Telegraphs, indicated the new series will feature two subjects over 12 stamps — Food Chains and Explorers' Aircraft.

Values in the set include 1 cent, 5c, 7c, 8c, 9c, 10c, 20c, 30c, 35c, 50c, and $1. The Food Chain stamps illustrate how creatures in the Antarctic are interdependent for food and survival; the Explorers' Aircraft feature six airplanes used by expeditions in the Antarctic during the 1920s and '30s.

The denominations and titles of the Food Chain stamps are 1c, Plankton; 7c, Adelie penguin; 9c, Leopard seal; 10c, killer whale; 20c, albatross; and $1, sperm whale.

The aircraft are as follows: 5c, Mawson's DH Gipsy Moth, 1931; 8c, Rymill's DH Fox Moth, 1934-37; 25c, Wilkins' Lockheed Vega, 1928; 30c, Ellsworth's Northrop Gamma, 1935; 35c, Christensen's Avro Avian, 1934; and 50c, Byrd's Ford Tri-Motor, 1929.

Two Melbourne artists, George Browning and Ray Honisett, designed the series with Browning doing the Food Chain designs and Honisett preparing the plane motifs.

Printing will be photograuvre at the Note Printing Branch of the Reserve Bank of Australia, Melbourne, on unwatermarked paper containing luminescence, in sheets of 100 subjects.

Sweden Honors Five Explorers

On Sept. 22 Sweden will issue a booklet of stamps titled "To Far-Away Places" featuring five famous Swedish Explorers on individual 1-krona values, reports the Post Office Section for Philately, Fack S-101 10 Stockholm 1, Sweden.

The explorers include Carl Peter Thunberg (1743-1828); Anders Sparrman (1748-1820); A. E. Nordenskiold (1832-1901); S. A. Andree (1854-1897); and Sven Hedin (1865-1952). Designs also depict scenes connected with the areas in which each made his discoveries.

The set was designed by Svenolov Ehren. Engraving was performed by C. Slania with printing to be done by the recess method at the Post Office Stamp Printing Works, Stockholm, on fluorescent paper. Jan Magnusson did the booklet layout.

Anders Sparrman was physician, botanist, explorer, and a disciple of Linnaeus, too. He traveled extensively and accompanied Capt. James Cook on his second circumnavigation of the earth (1772-1775).

He described his journey in the book "Journey to the Cape of Good Hope, the Antarctic. Circle and Round the Globe."

A. E. Nordenskiold, baron, geologist and explorer, took part in several expeditions to Spitsbergen, and on July 21, 1878, set off for Tromoso on the ship "Vega" on his famous voyage through the Northeast Passage.

After taking shelter for the winter he continued his voyage in July 1879 through the Bering Strait, thus accomplishing the Northeast Passage.

S. A. Andree, engineer and physician, took part in an expedition to Spitsbergen in 1882-1883, where, among other things, he made observations concerning atmospheric electricity, and thus became interested in scientific balloon expeditions.

The two most successful of these balloon expeditions were across the Baltic from Stockholm to the Finnish archipelago, and from Gothenburg to Gothland.

On July 11, 1897, he set off on an expedition to the North Pole. The last message from the balloonists was dated three days later, and until Aug. 22, 1930, when their last camping site was discovered, their fate was unknown.

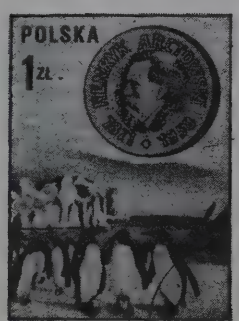
Greenland Sets Charity Issue

On Oct. 18 Greenland will release a 70-ore plus 20o semi-postal to aid the victims of the volcano eruption on the Icelandic island of Heimaey.

The design features a volcano erupting with a town in the foreground. The colors are blue, gray and red.

The designer was Birgit Forchammer. It was engraved by Czeslaw Slania Printing will be in sheets of 50 subjects on fluorescent paper, report postal officials in Copenhagen,

The 4kop salute to Krenkel features the portrait of the USSR polar explorer and views of the first polar station in Matochkin Shar (Ball) Strait, 1924; and the "Cheluskin," legendary ship on the North Sea Line. It was designed by E. Aniskin.



1.00 zł
Henryk Arctowski / 1871-1958
explorer, geographer, geophysicist

Four more commemorative stamps were placed on sale in Austria on Aug. 24, according to that country's postal service.

The 100th anniversary of the discovery of Franz Josef Land is the subject of the third stamp, which has a denomination of 2.50s and features a portion of a painting by J. Payer. The original is in the Museum of Natural History in Vienna.

Recess printing was in an edition of 3,200,000 copies.

Austria launched an Arctic expedition under the guidance of Josef Payer in June 1872 utilizing the vessel Admiral Tegetthoff under the command of Karl Weyprecht. Departing the Norwegian harbor of Tromso, the team set out to search a route to the North Pole and for the long sought Northeast Passage to China over the northern coasts of Europe and Asia.

Soon after leaving the island of Novaya Zemlya, the ship became ice-bound and drifted at the mercy of the winds and currents. After untold hardships, Payer notes in his diary that on Aug. 30, 1873 (14 months after setting out), the crew sighted a new territory and named it Franz Josef Land after the then Austrian emperor.

'Century' Issue

The July - August "century" edition of "Ice Cap News," publication of the American Society of Polar Philatelists, featured a record 14 regular columns, including entries making their initial appearance.

Hal Vogel, ASPP publicity director, reported the 100th issue, featuring a special birthday anniversary blue jacket, edited by Bernard V. Coyne.

A series of specialty articles includes a report illustrated with six JARE covers by a Japanese correspondent concerning his nation's Antarctic activities during 1972-73 and a philatelic activities article on the 1972 Dutch Spitsbergen expedition from an authority in Holland.

A South African revealed plans for the forthcoming release of three South African Antarctic station cachets.

Persons interested in polar philately are invited to contact the ASPP secretary, Russell Ott, 8912 S. Country Club Drive, Oklahoma City, Okla. 73159. Dues are $5 a year including a subscription for six issues of "Ice Cap News."

SOVIET STUDYING NORTHERN LIGHTS

Rocket Injects Electrons Into Atmosphere In Experiment

By THEODORE SHABAD
The New York Times

MOSCOW, July 3—In an unusual space experiment, a Soviet sounding rocket, rising more than 100 miles above the earth, has injected a beam of electrons into the upper atmosphere to produce an artifical display of the Northern Lights, a well-known but little understood natural phenomenon.

The experiment, conducted a month ago and only now disclosed, would appear to confirm a widely accepted theory that the luminous effect of the Northern Lights is produced by electrically charged particles such as electrons, ejected at high velocities from the sun.

The aurora borealis, as the effect is also known, is best visible at night in polar latitudes. The lights are most frequent and brightest during periods of intensive sunspot activity.

The creation of the artifical aurora was achieved by a Soviet meteorological rocket carrying a small particle accelerator that injected the electrons into space. More than 300 photographs of the display are reported to have been taken by Soviet ground stations, but none was immediately made public.

The artifical aurora experiments are in preparation for a similar project to be undertaken jointly by the Soviet Union and France from the French rocket base on Kerguelen island in the Indian Ocean. The project is part of a program of Soviet-French space cooperation.

Details of the Soviet aurora experiment were disclosed by Vladimir V. Migulin, a radio physicist, who is director of the Institute of Earth Magnetism, Ionosphere and Radio-Wave Propagation. The institute, situated southwest of Moscow, was the coordinating center for the aurora experiment.

According to the account given by Mr. Migulin to Tass, the official press agency, the Soviet meteorological rocket, MR-12, was launched during the night from May 29 to so from an unidentified base.

The Russians are known to have a weather-rocket base on Hayes Island in Franz-Josef Land, an Arctic archipelago, and at the Kapustin Yar Space Center, east of Volgograd.

As described by the Soviet scientist, the small electron accelerator carried by the rocket began to eject the negatively charged particles after the rocket reached an elevation of about 60 miles, beyond the denser layers of the atmosphere.

The electrons were injected downward along the lines of force of the earth's magnetic field, which causes compass needles to point to the north. The injection continued for several minutes until the rocket reached an elevation of 110 miles.

According to the Soviet account, the energy imparted to the electrons was 7,500 to 9,000 electron volts, and the electrical power of the entire beam was about four kilowatts. By comparison, the big particle accelerators on the ground are capable of generating energies of billions of electron volts.

The experiment, which bore the code name Zarnitsa (heat lightning), was described by Mr. Migulin as significant because it shifted research from the passive stage of recording natural phenomena to the active simulation of such events.

He said that, by changing the conditions under which electrons were injected into space, scientists might ultimately gain a clear idea of the precise mechanism by which charged particles from the sun enter the atmosphere to produce the Northern Lights.

Aside from simulating the aurora, electron injection may also be used to investigate the behavior of such particles in the earth's magnetic field, as well as the configuration of the field, Mr. Migulin said.

The aurora experiment was headed by I. A. Zhulin, a specialist on solar-terrestrial physics. The experiment involved a group of institutes of the Soviet Academy of Sciences, the Ukrainian Academy, Kiev University and the Weather Bureau.

The electron machine, in which particles generated by a so-called ion source are accelerated by a high voltage, was manufactured by the Paton Electric Welding Institute in Kiev.

RCA PLANS TO BETTER ITS ALASKAN SYSTEMS

Sept. 13

The RCA Corporation expects to spend "at least $110-million" in the five years ending in 1976 on expansion and modernization of Alaska's communications system, Robert W. Sarnoff, chairman, said in a speech prepared for delivery last evening at Anchorage.

Mr. Sarnoff said that an additional $100-million had been scheduled for RCA's proposed domestic communications satellite system that is expected to be operating by late 1975. This would link Alaska with the outside world as well as to the 48 contiguous states.

The RCA chairman also said that his company was prepared to spend an additional $25-million to install and operate "fail-safe" communications system combining land-based and satellites communications for the proposed trans-Alaska oil pipeline.

RCA bought the Alaska Communications System from the Air Force in January, 1971 for $28-million and has already spent $36-million in improvements. It expects to spend $55-million more before year-end, according to Mr. Sarnoff.

Greenland Planning To Search for Oil

The New York Times

COPENHAGEN, Denmark, Dec. 27—The Danish Government will start negotiating oil-search leases for Greenland's west coast within a few months and the outlook is promising, according to Lars Chemnitz, head of Greenland's Government.

Mr. Chemnitz, a 48-year-old schoolteacher, is chairman of the 16-member provincial council and is, in effect, Premier. He presides over a scattered community of 50,000 people largely dependent on fishing, hunting and sheep-rearing — and on subsidies from Denmark, of which Greenland is a province.

Hopes of making Greenland less dependent on the mother country rest largely on oil, minerals and light industry. Mr. Chemnitz said Greenland might never become self-sufficient, but with development she could be less of a burden on Danish taxpayers. He was speaking in Copenhagen reecntly, where he took part in the first Arctic Peoples' Conference, which brought together Lapps, Eskimos, Canadian Indians and Greenlanders.

"As far as oil is concerned, tests have been very promising," Mr. Chemnitz said. "In fact, the tests from our Continental Shelf indicate the area looks better than other sites where oil has been found elsewhere in the world."

About 25 oil groups, many of them American, have filed for drilling leases and will soon begin negotiations with the Danish Government.

The environmental problems are considerable. Greenland, unlike Alaska, has no tundra. Bottom-dragging icebergs could tear out installations and let oil flow into coastal waters.

"We were somewhat doubtful at first," Mr. Chemnitz said, "because the Arctic is a very sensitive area. When you live off the resources of the sea, you have to be careful what you allow to flow into it."

With oil drilling not many years off, and zinc and lead-mining under way, Greenland is taking a big step into the future. However, mining and oil exploration are not expected to support Greenlanders in a Scandinavian - style welfare state,

2 Gold Medals to Be Given By Geographical Society

The American Geographical Society announced Dec. 1 that it would present two gold medal awards at its annual dinner at the Delmonico Hotel on Tuesday.

Walter Sullivan, science editor of The New York Times and a councilor of the society since 1959, will receive the Charles P. Daly Medal, first presented in 1902, for "valuable and distinguished geographical services or labors."

The Cullum Geographical Medal, awarded to "those who distinguish themselves by geographical discoveries or in the advancement of geographical science," will be presented to Dr. Bruce C. Heezen of the Lamont-Doherty Geological Observatory.

CONSERVATIONISTS ASSAIL THE SOVIET

The New York Times

WASHINGTON, Nov. 17—A coalition of national conservation groups has chided the Soviet Union's refusal to comply with international conservation measures for whales as "more greedy, imperialistic and exploitive than any capitalist nation, with the exception of Japan."

The conservation groups, operating under the name Project Monitor, charged that by "helping to wipe out this irreplaceable resource for the sake of an easy profit Russia is violating its own Marxist-Leninist principles and is surpassing the worst excesses of capitalism."

Dr. Robert M. White, the United States commissioner to the International Whaling Commission held last June in London, disclosed last month that both Japan and the Soviet Union had refused to comply with conservation decisions that came out of the meeting.

Dr. White termed the actions of those two nations a "serious setback to protection of the world's whale population."

STORM

At its best, winter in Greenland is hostile. About 100 miles below the Arctic Circle, near the 66th parallel, on the eastern coast of Greenland, lies Kulusuk, the site of Dye 4 (after Cape Dyer) DEW Line Station. Here, temperatures average −30°F. Winds of 50 miles an hour are not uncommon. And whiteouts—ice-crystal fogs that completely obscure visibility—are an ever-present risk.

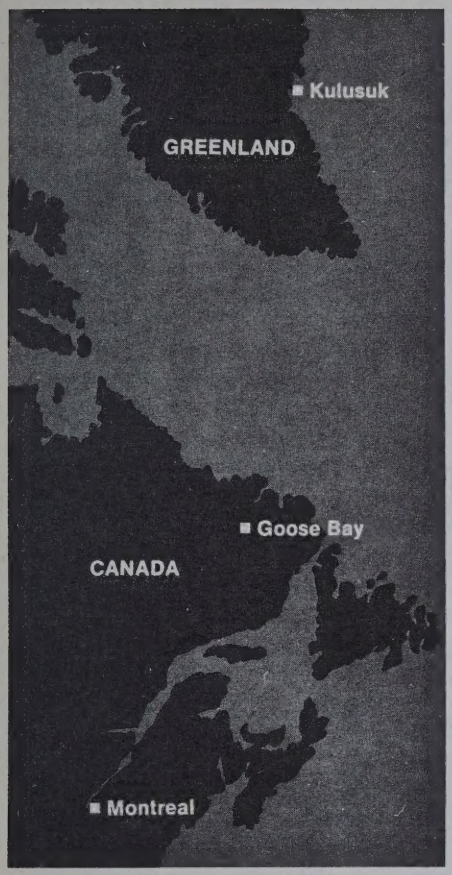
In this bitter environment, the 16 crewmen of Dye 4 maintain and operate a link in the Distant Early Warning radar system that detects the approach of manned aircraft. Together with their co-workers at the other stations, the 10 employees of Operation and Maintenance Service, Inc., a subsidiary of RCA, and six Danish contract workers face the constant isolation and danger of the far north. But none of them expected the days of crisis in mid-January caused by what one called, "the worst storm in years."

Daily dispatches from Dye 4's sector headquarters at Sondrestrom, Greenland, to Operation and Maintenance Service (OMS) headquarters in Colorado Springs tell how 16 men kept this vital link in the outer ring of the nation's defense operating through two weeks of icy hell.

Friday, January 12. Night winds gust up to 115 miles per hour. During the early morning hours, 10 roof panels and a side panel blow away from the garage (also known as the survival building), one of three buildings at Dye 4's radar site. The Low Frequency Beacon Antenna, which guides aircraft onto the landing strip, blows down and is out of action. There are no injuries. "Morale remains good," the report concludes, "since most personnel have experienced such storms before."

Saturday, January 13. A clearer assessment of the storm comes today. "This is the first time that anyone here has observed a wind storm from the east," says the report. Chuck Powers, Manager of RCA Defense Warning Systems at project headquarters in Colorado Springs, explains further: "A very strong low-pressure system from the Gulf Stream hit the cold Arctic air, causing a hurricane-like storm system. The winds kept changing direction and whipsawed the buildings."

Daylight inspection shows still more



January became an icy hell when 115-m.p.h. winds lashed the Dye 4 DEW Line station in Kulusuk, Greenland, for two weeks.

panels blown away and the billboard antennas with panels blown off. The anemometer also has been damaged, so all wind speeds must now be estimated. Repair material, loaded on aircraft at Sondrestrom, is grounded by a new storm.

Sunday, January 14. The storm rages on, with northeasterly winds of 70-90 miles an hour. Additional damage includes a 12-foot-by-8-foot hole in the roof of the Composite Building, which houses both personnel and radar apparatus.

Monday, January 15. Four days of torment, and it keeps getting worse. During the early morning, debris starts falling into the heat-exchanger room. "We are unable to tie down the adjacent panels due to the blowing debris," the report says, adding that the Low Frequency Beacon, which had been put back in operation after initial damage two days earlier, has again failed. The garage roof has three gaping holes, two of them measuring more than 21 feet across. The floor level of the garage is filled with snow, while the second floor is rendered a total loss.

Tuesday, January 16. Winds abate, but there's a new danger—snow. "Snow is accumulating in the attic and, if it melts, it will create water problems in the radio terminal building," says the day's report. All equipment is covered with tarps to keep it dry.

Wednesday, January 17. Dye 4 faces a new and vigorous storm. Buildings that had lost roofs to the previous storm are now ready to collapse. "All conduits containing coaxial cable are breaking with the flex of the wall," says one message. "When these are broken, we lose lateral communication to the west." Gymnasium roof panels are coming loose from their beams, letting in still more snow. "If the roof fails," says one message, "the wall panels could fail also." Personnel and power generation are jeopardized. The weather, which forecasts predict will get worse, virtually isolates Dye 4. The day closes with this report: "Operations continue. Personnel morale remains high."

Thursday and Friday, January 18 and 19. Weather clear and dry.

Saturday, January 20. A new storm, this time generated by a low-pressure system to the south, begins to hammer Dye 4. "Each storm creates more damage, as structural integrity of buildings is destroyed...We have had aircraft loaded with emergency repair materials since January 13, and have been unable to airlift the materials, plus engineers and work force, to the disaster area." Even if the airlift could reach Dye 4, landing would be problematical. "Under the snow at Kulusuk is a heavy layer of ice resembling a skating rink," says the Sondrestrom report. If landing on the airfield is successful, there are still five miles of snow-drifted road to the radar site.

Sunday, January 21. Winds are gusting to 115 miles an hour, accompanied by heavy snow. Buildings battered by winds for nine days are now getting what one of the Dye 4 party describes as "structural shudders." The station's personnel, wet, cold, and exhausted, feel shudders of their own as they prepare to withstand still another assault.

Monday, January 22. Gusts rise to more than 150 miles an hour: "Visual inspection of certain areas denied by flying and falling debris. The ceiling in the Lateral Communications room is flexing—dropping the globes and light bulbs on the floor, creating another personnel hazard." Later on, the report relates, "The gymnasium roof is disintegrating...Entrance door to gym has been nailed shut to prevent further entry and help stabilize wall. Station chief estimates remaining roof will be gone in one hour...Lead mechanic estimates he can continue to operate unless roof caves in...All personnel wearing hard hats and safety goggles...The anemometer, which had been recording wind direction, blows off...A rock blows through the windshield of the truck, and a door blows off. Truck slides 20 feet with brakes on..."

For the personnel it becomes hairier still: "Rocks about eight inches in diameter are flying through the air...Panels that had been knocked off the roof are being blown around by gusts ...This is a unique experience for personnel who have been here up to seven years..."

Tuesday, January 23. The storm subsides, and, at last, relief flights begin to arrive. Repairmen arriving from Sondrestrom find that, despite the storm and extensive damage, the crew of Dye 4 has kept the station functioning. For example, the giant engines that power the entire station were somehow kept dry and serviceable through the entire period.

Dye 4 is repaired and intact again, and its crew is looking forward to May temperatures of 10° to 30°F. But they won't forget last winter.

Dye 4's OMS Crewmen

Michael C. Shaw, Laurel, Md., Station Supervisor
James J. Kizak, Twinburg, Ohio
Walter R. Doughty, Fort Fairfield, Me.
Dale E. Mangels, Port Orchard, Wash.
Johnny Eng, Oakland, Calif.
Joseph F. Wiezorek, Chandler, Ariz.
Robin D. Evans, Pittsburgh, Pa.
Darrell L. Perkins, Independence, Ore.
Robert M. Burke, Darby, Pa.
Richard S. Sheehan, Levittown, Pa.

RCA magazine Communicate

Bernt Balchen, Explorer And Pilot in Arctic, Dead

The New York Times

MOUNT KISCO, N.Y., Oct. 18 — Col. Bernt Balchen, U.S.A.F., retired, the aviator and explorer who was chief pilot on Adm. Richard E. Byrd's first flight over the South Pole in 1929, died yesterday in Northern Westchester Hospital. He would have been 74 years old Tuesday. His home was in Chappaqua, N.Y.

Surviving are his widow, the former Audrey C. Schipper and two sons by prior marriages, Bernt Balchen Jr. of Oslo and Lauritz Balchen of McLean, Va.

A military service will be held Monday at noon in the Protestant Chapel of Kennedy International Airport. Burial will be in Arlington National Cemetery on Tuesday at 1 P.M.

Many-Faceted Career

Bernt Balchen was an extraordinary aviator with a particular mastery of Arctic flying that amounted to genius.

He was at the same time an explorer, soldier, and championship-caliber skier and boxer. And he possessed such stores of energy—evident in a robust physique and a charmingly alert manner—that he found time, on the side, to write several books and develop, without formal instruction, an interesting if technically deficient style as a watercolorist.

Mr. Balchen gained supporting-cast world renown in the Lindbergh era for his flights across the Atlantic and the South Pole with Admiral Byrd. Many another "name" of that romantic age quickly dropped from sight. But the husky Norwegian kept adding to his luster, with tricky rescue missions, military ventures and Arctic pioneering.

Mr. Balchen was almost 27 (he was born in Tveit, Norway, on Oct. 23, 1899) when he first became known in the United States. This was the outcome of a chain of events that started with his assignment to the Amundsen-Ellsworth-Nobile expedition to the North Pole.

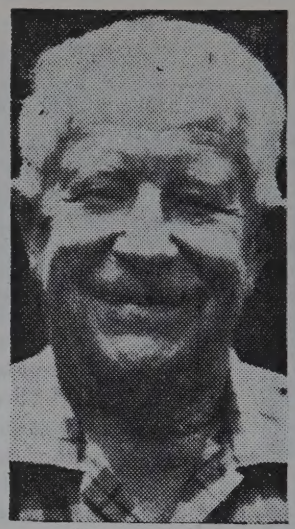
He was a naval flight lieutenant at the time. The expedition was preparing at headquarters in Spitsbergen to fly over the Pole in the dirigible Norge. Also at Spitsbergen was a Byrd expedition getting ready to fly to the Pole in the airplane Josephine Ford.

When the pilot of the Byrd plane, Floyd Bennett, ran into trouble urging the ski-equipped craft into the air on practice runs, Lieutenant Balchen was lent out to see if he could help. The former ski champion tried waxing the plane's skis. This did the trick, and the Byrd plane was able to make the first flight in history over the Pole.

The young Norwegian soon afterward accepted an offer from Admiral Byrd, then a commander, to come to the United States. He became a test pilot for Anthony H. G. Fokker, builder of the Byrd polar plane. In numerous flights, he acquired a solid reputation as one of the most skillful bad-weather pilots in the country.

In 1927 he piloted the trimotor America for Admiral Byrd on his dramatic transatlantic flight. The plane fought its way through fog and a succession of storms to the French coast. Admiral Byrd navigated the plane to a lighthouse at Ver-sur-Mer. With the shore dimly outlined by flares, Mr. Balchen skillfully set the plane down on water and all on board made shore safely.

The following year, Mr. Balchen and Floyd Bennett



Bernt Balchen

got up from sick beds to fly a plane to rescue the crew of the German airplane Bremen, which had made a forced landing off the Labrador coast. Mr. Bennett came down with pneumonia en route, was rushed to Quebec and before long was dead. Mr. Balchen pushed on and brought out the Bremen fliers.

The 1929 flight over the South Pole, according to the self-effacing Mr. Balchen, was "just another piece of flying." But those with him told admiringly how he had nursed the heavy plane through mountain gorges, judging with uncanny skill just how much to strain the engines. Emergency provisions were jettisoned to get the plane past the last peaks in front of the 10,000-foot-plus pleateau on which the Pole itself lies. He proved again that he was a great pilot and an expert meteorologist.

From 1933 to 1935, Mr. Balchen was chief pilot of the Ellsworth Antarctic Expedition, and from 1935 until 1940 he was chief of inspection of Norwegian Airlines.

It was inevitable that with the coming of war Mr. Balchen would soon find a way to contribute his talents to the Allied effort. During 1940 and 1941 he ferried planes for the Royal Air Force from San Diego, Calif., to Singapore. Three months before Japan's attack on the United States he accepted an offer to join the Army Air Forces as a captain.

He was assigned to Greenland where he directed the building of and commanded the air base known as Bluie West Eight. He spent considerable time directing the rescue of airmen forced down in that forbidding country. Once he guided 13 crewmen of a downed B-17 across alpine-like ice fields to a temporary lake, where an amphibian plane picked them up. The lake disappeared next day.

In autumn, 1943, Mr. Balchen, then a colonel, was transferred to Europe where he spent the rest of the war performing some extremely unorthodox duties. Neutral Sweden cooperated in a project that involved flying unarmed planes at wave-level height in a shuttle service between Sweden and Scotland.

Colonel Balchen made many such flights, evacuating from Sweden a few thousand fellow Norwegians, as well as 1,000 American airmen.

Colonel Balchen's sub rosa operations branched out in the summer of 1944. With a complement of six war-weary Liberator bombers, he directed a shuttle operation from Sweden to supply the Norwegian underground with agents, arms, medicine and radio equipment. On one occasion the brash Norwegian is said to have crossed the border into German-occupied Norway, made his way to Oslo and left next day after mailing a postcard to the local Gestapo chief.

In 1946, Colonel Balchen was president of Norwegian Airlines when it became the parent company of Scandinavian Airlines, of which he became a consultant on its polar route. In 1948 he was recalled to active duty with the United States Air Force and named commanding officer of the 10th Rescue Squadron at Fort Richardson, Alaska.

George Grimminger, 67, Meteorologist With Byrd

WASHINGTON, Dec. 20 — George Grimminger, 67, a prominent meteorologist who participated in Adm. Richard E. Byrd's second 56-man Antarctic expedition, died at Sibley Memorial Hospital Monday after a heart attack. He lived on Meadow Hall Drive in Rockville.

For his participation in the Byrd expedition of 1933-35, Mr. Grimminger was awarded a special Congressional medal.

He received his BS degree in 1933 from George Washington University, and his Master's degree from the Massachusetts Institute of Technology in 1938 following the Byrd expedition. Mr. Grimminger's book on the upper atmosphere was a pioneer study which helped pave the way to space exploration.

A meteorologist with the U.S. Weather Bureau until 1935, Mr. Grimminger moved to the David Taylor Model Basin, now the Naval Research and Development Center, as a physicist. He also worked as a research analyst with the Douglas Aircraft Corp. in Santa Monica, Calif., where he later became a research analyst with the group that founded the Rand Corp.

In 1949 Mr. Grimminger returned here to serve as scientific warfare adviser to the Weapons Systems Evaluation Group of the Joint Chiefs of Staff. He was then a science adviser to the Army from 1952 to 56.

At the time of his retirement in 1962, Mr. Grimminger was a chief of weaponry research for the Air Force.

He leaves his wife, Virginia, and his mother, Mrs. Addel Grimminger, both of Rockville.

WOLF V. VISHNIAC, MICROBIOLOGIST

Rochester Professor Killed in Accident in Antarctic

ROCHESTER, Dec. 11 (AP)—Dr. Wolf V. Vishniac, a microbiologist, fell to his death in Antarctica while on a scientific expedition, it was reported Tuesday. He was 51 years old.

The Navy informed the University of Rochester, where Professor Vishniac was a member of the biology department faculty, that he had plunged about 500 feet down an ice slope, high in the Asgard Mountains yesterday.

He was on a three-month trip with Prof. Zeddie Bowen of the university's geological sciences department. They were part of a United States Antarctic research program operated by the National Science Foundation and were studying how microbes multiply in the arid soil of Antarctica.

The Navy reported that Professor Bowen had gone in search of Dr. Vishniac after he was overdue in returning from a routine 12-hour hiking excursion along a marked trail. Dr. Vishniac had apparently left the path and walked onto an ice field, the Navy said.

His body was recovered by the crew of a Navy helicopter. It was returned to McMurdo Station in Antarctica today and will be flown to Rochester.

Professor Vishniac was deputy team leader of a seven-man group that devised instruments to pick up and study soil samples to seek signs of life on Mars. Their experiment was to take place during an unmanned "Viking Landing" project scheduled for 1975-76.

Professor Vishniak was to have been one of the people operating, by remote control, the arms of the instrument that will scoop up soil from the Mars landscape.

He leaves his wife and two sons.

Memorial for Vishniac

McMURDO, Antarctica, Dec. 13 (UPI)—A memorial serivce was held yesterday at McMurdo Chapel for the American biologist Wolf Vishniac, killed Tuesday in a 500-foot fall from an Antarctic ice shelf. Dr. Vishniac came to Antarctica under a National Science Foundation project five weeks ago and was scheduled to return home next month.

Rennie Taylor Dead at 77; A Science Writer for A.P.

SANTA ROSA, Calif., Aug. 7 (AP)—Rennie Taylor, a former science writer for The Associated Press, died yesterday after a stroke. He was 77 years old.

Mr. Taylor retired in 1961 to a fruit ranch he had owned since the nineteen-thirties near this Northern California community.

His assignments for A.P. included travel to the Soviet Union and, in 1958, to Antarctica to cover "Operation Deepfreeze."

His awards included the American Association for the Advancement of Science — Westinghouse Award for articles on astronomy, although he wrote in all fields of science.

Survivors include two sisters, Mrs. H. J. Danner and Isabelle Feathers.

Lt. Comdr. William Bowlin Dies; Navigator for Byrd in Antarctic

LEMON GROVE, Calif., Aug. 9 (AP)—Lieut. Comdr. William M. Bowlin, U.S.N., retired who was Admiral Richard E. Byrd's personal navigator on his second Antarctic expedition, died Tuesday in his home here. He was 74 years old.

Surviving are his widow, Mary and a son.

Commander Bowlin, one of the Navy's first fliers, won the Distinguished Flying Cross and a Congressional medal for scientific exploration in the Byrd expedition, which extended from 1933 to 1935.

In 1925, while serving as chief mechanic on one of two Navy seaplanes making the first military flight from the mainland to Hawaii, his plane crashed 300 miles from Hawaii. He was feared dead for days before the craft was found and towed into port. The crew had survived by converting the seaplane into a makeshift boat.

Commander Bowlin had been one of four crew members of a plane piloted by Comdr. John Rodgers. After their ordeal, the men received a welcome of heroes in Hawaii.

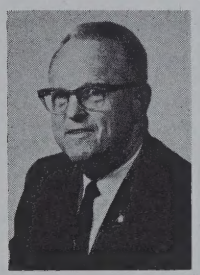
They also were enthusiastically received when they returned to San Francisco, from where the seaplane had set out to make history as a nonstop mail carrier. In San Francisco, Commander Bowlin, then an aviation machinist mate, was described as the only "gob" —or enlisted man— of the crew who was having "the time of his life" shaking hands with admirals and high officials.

During the Antarctic expedition, Commander Bowlin and other members of Admiral Byrd's crew underwent many hardships, including at one point, getting lost in the vast stretches of the uncharted land mass at the South Pole.

In March, 1934, Commander Bowlin, the pilot of a small monoplane making short explorations, was forced down in dense fog. Admiral Byrd rescued him and another crew member. Their plane was sighted about 15 miles southeast of Little America. The two fliers were found asleep in a tent when Admiral Byrd landed.

Born in Roachdale, Ind., on March 19, 1899, Commander Bowlin enlisted in the Navy in 1918, entering the aviation service that same year. He received his preliminary training at Great Lakes Naval Station, and later qualified as a pilot at Pensacola, Fla.

Ben Webb Harlin 1911–1973



Ben W. Harlin, who retired in 1970 after 30 years of service with the Weather Bureau, died 15 March 1973 of a heart attack. Mr. Harlin was educated at Cumberland University in Lebanon, Tenn., where he took the B.S. degree in 1934 in chemistry and mathematics; he later studied physics and education at the University of Tennessee, Knoxville, and took graduate courses in meteorology at the University of California at Los Angeles during the academic years 1947–48.

Mr. Harlin began his Weather Bureau career at Knoxville, Tenn., in 1940 as a Junior Observer, transferred to LaGuardia (now Kennedy) Airport for a year, prior to joining the U.S. Marine Corps for a four-year stint during the second World War. Rejoining the Weather Bureau in 1946, Mr. Harlin served in various places such as Nashville, Tenn., Birmingham, Ala., and Louisville, Ky. During the International Geophysical Year (July 1957–June 1958), he served as Meteorologist in Charge of the Little America Station in Antarctica and during 1961 he was Station Scientific Leader as well as MIC at the Amundsen-Scott South Pole Station. For this antarctic service he received the Department of Commerce Silver Medal in 1959 and the Department of Defense Antarctic Service Medal in June 1965; and in 1965 the geographical feature located at 70°53′S, 160°50′E in northern Victoria Land, Antarctica, was named the Harlin Glacier by the U.S. Board of Geographic Names.

Between his two antarctic assignments, Mr. Harlin was at the Meteorological Satellite Section of the Weather Bureau in Washington. After returning from the ice a second time, Mr. Harlin was assigned as Meteorologist in the Weather Bureau Research Station at Fort Huachuca, Ariz., where he remained until his retirement in 1970.

Mr. Harlin joined the American Meteorological Society in 1948. He is survived by his wife, Joie Harlin at Box 2, Tombstone, Ariz. 85638.

Heath Twichell, 77, Dies; Alcan Highway Engineer

The New York Times

WASHINGTON, Nov. 23—Heath Twichell, a retired Army colonel who just before World War II commanded the 95th Engineer Regiment, which built part of the Alcan Highway linking Alaska to the Pacific Northwest, died Tuesday at the Veterans Administration Hospital. He was 77 years old and had lived at Cove Point Beach, Md., since his retirement in 1954, following service since his graduation from the United States Military Academy in 1918.

After the invasion of Normandy in World War II, Mr. Twichell commanded the 333d Engineer Regiment, which rebuilt Cherbourg Harbor and followed the advance through France and Germany.

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